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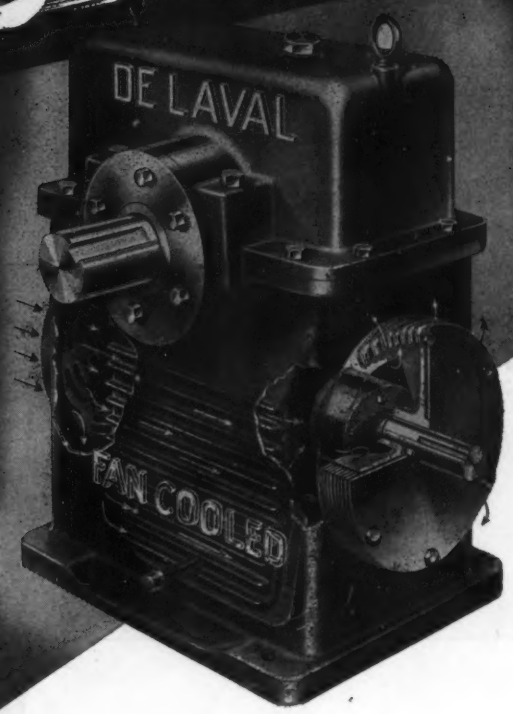

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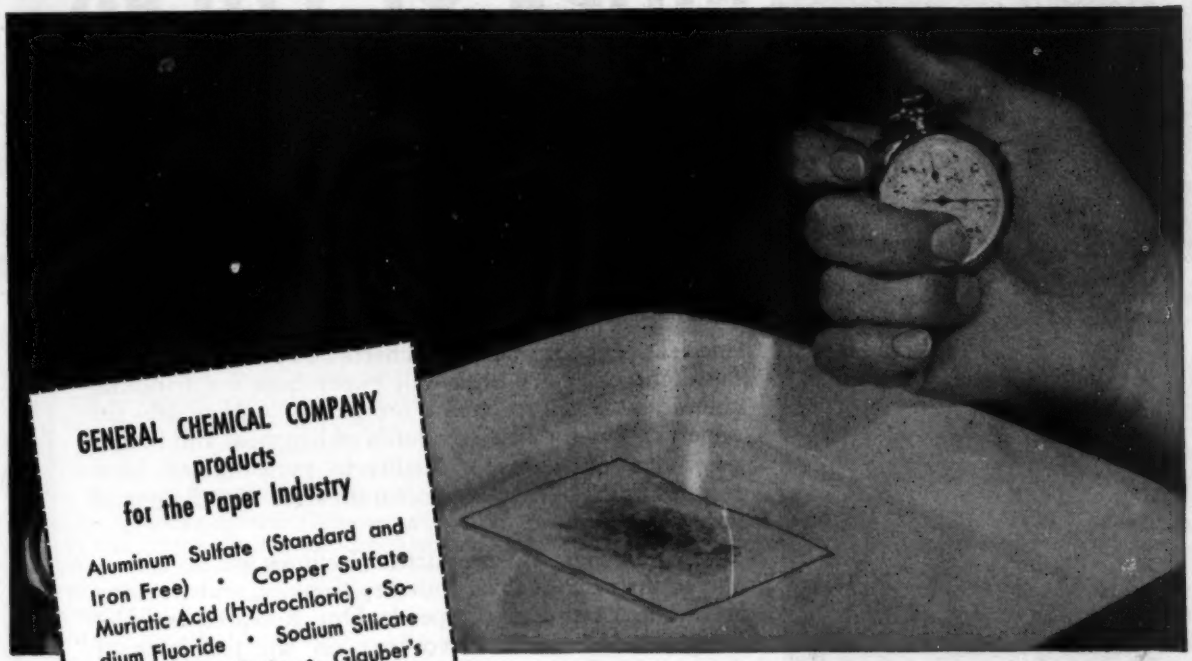

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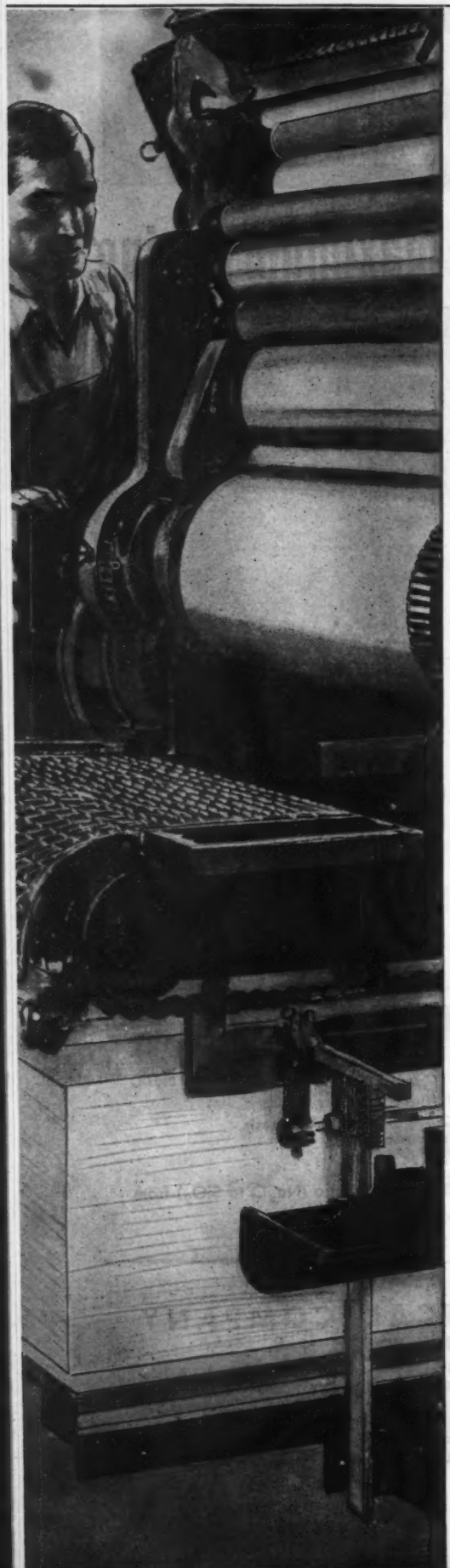

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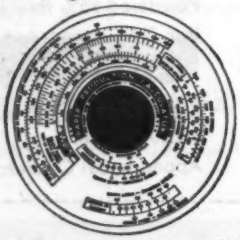

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PAPER TRADE JOURNAL

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July 5, 1945

Contracts to Buy Wisconsin River Paper Co.

Consolidated Water Power & Paper Co. Would Acquire Property of Only Remaining Newsprint Mill In State — S. F. Shattuck Retires—Associates Honor J. E. Schnabel—Other Industrial News.

APPLETON, Wis., July 2, 1945—The Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., has contracted to buy the real estate, buildings and dam of the Wisconsin River Paper and Pulp Company in the town of Plover, south of Stevens Point, Wis., Stanton W. Mead, vice president, announced Friday, June 29.

The Wisconsin River company is the only one in Wisconsin still making newsprint, and supplies 14 newspapers in the state. Consolidated is planning to convert to coated book papers, but will carry out present newsprint contracts, and has announced willingness to furnish newsprint until its customers are able to establish other sources.

The new properties are located on the Wisconsin river below the dam, power house and paper mill of Consolidated's Stevens Point division. Wisconsin River will continue as a separate corporation until its stock has been liquidated, which is expected to require about a year. Survivors of the late C. A. Babcock of Neenah, Wis., hold practically all of the capital stock and it was said that they were not interested in carrying on the business. Negotiations for the sale were in process only a few weeks.

Mr. Mead said that Consolidated is contemplating no immediate changes in mill management or personnel. About 150 persons are employed. They will bring the total Consolidated payroll to over 2,500.

As a newsprint mill, Wisconsin River has a production capacity of 90 tons per 24-hour day, the raw material for which is 80% groundwood pulp and 20% sulphite pulp. The company produces its own wood pulp with grinders driven by water wheels and the sulphite pulp has been purchased on the market. Capacity of the groundwood mill is 95 tons in 24 hours. Newsprint is made on two machines, one of which produces a sheet 112 inches wide and the other, 102 inches. The dam maintains a head of 22 feet of water and produces about 7,500 horsepower which is utilized by the mills. This power is about the equivalent of that produced at the Biron mill of Consolidated.

The conversion to Consolidated's regular grades of coated book paper will be made as soon as conditions permit, Mr. Mead said, adding:

"This will require extensive additions and improvements so as to produce a paper of high quality for which Consolidated is finding an increasing demand."

The company now makes coated book paper for magazines, periodicals and other purposes in its Wisconsin Rapids and Biron mills. The company's mill at Stevens Point produces coated opaque waxing paper and tissues while its Interlake mill at Appleton produces bleached Mitscherlich sulphite for use at its plants and for sale on the market.

The Wisconsin River Paper and Pulp Company was organized in 1891 by George A. Whiting of Neenah, Wis., William T. Whiting of Menasha, Wis., and R. C. Russell of Oshkosh, Wis., and was capitalized at $250,000. Stock originally was held by Fox River Valley residents. Its place of business was the town of Plover, Portage County, but this was changed in 1912 to Neenah, which remains their headquarters.

S. F. Shattuck Retires

S. F. Shattuck, vice president of Kimberly-Clark Corporation, Neenah, Wis., severed his active relationship with the corporation on July 1, after 45 years association with the firm. He also retired as a member of the executive committee, but will continue as a member of the board of directors.

He was responsible for the development of the corporation's industrial relations department, which serves all mills and offices of the company. He also had a large part in the formation of the Kimberly-Clark Retirement Trust.

Mr. Shattuck's request for retirement was a long-standing one, but his resignation was not accepted until the June meeting of the directors. He expects to devote his time to various avocations and community interests. He is president of the Chamber of Commerce, which serves both Menasha and Neenah.

Complete Initial Foremanship Course

Fifty supervisors of the Kimberly-Clark Badger Globe mill at Neenah, Wis., have completed the first phase of a foremanship training program outlined and promoted last fall by department heads and members of the Foremen's club. Bi-weekly discussion meetings, interspersed with talks of educational nature by staff men of the corporation and the University of Wisconsin, featured this year's program.

Associates Honor J. E. Schnabel

A group of 25 long-service executives from the mills and offices of Consolidated Water Power and Paper Company met informally Sunday afternoon, June 24, in the office of George W. Mead, president, to honor John E. Schnabel, general purchasing agent. The occasion was his fiftieth year in the paper making business. The gathering was a surprise, Mr. Schnabel assuming he had been called to a business conference.

C. E. Jackson, mill manager, Wisconsin Rapids, opened the meeting with a tribute to Mr. Schnabel, and Mr. Mead spoke informally. Earl F. Otto, superintendent of maintenance and stores also spoke briefly.

Midwest Market More Optimistic of Future

Paper Supplies Are Now At Very Low Level But Prospect of Removal of Some Limitations On Materials Is Viewed As Encouraging—Schools Form Salvage Club—Salesmen Entertain Veterans.

CHICAGO, Ill., July 2, 1945—While the actual picture in the Chicago area is little changed over last week, there is an obvious note of optimism engendered by the belief that the end of the year may see a lifting of most of the current restrictions. The optimism comes not so much from any single piece of news but rather from a putting together of little changes here and there. For instance, according to local reports, one of the limitation orders on an important chemical in paper making is soon to be lifted. The wall paper industry is now working on a base period program of 80% of 1942 production instead of 60%. Here and there other restrictions are being lifted or trimmed. Actually, there is no more chemical, no more wall paper, no more of any kind of a product than there was a month ago but the whole picture is taken to mean—by Chicago paper trade executives at least—that WPB means it when it says it is getting ready to take off all the brakes. Lifting restrictions, even though the actual amounts and tonnages remain unchanged, mean that this much of the red tape, at least, is out of the way.

Otherwise, Chicago paper trade circles are maintaining a status of watchful and hopeful waiting. Jobbers are down to a minimum in stocks but do have a reported plentiful supply of cash to go in and give the industry a splendid impetus in its post war job of providing paper and jobs. Specifically, lines represented locally, were little changed over a week ago. Waste papers were still short in the area although local collections were reported improved.

Salesmen Entertain Veterans

Five World War II veterans from Vaughan General Hospital, Hines, Illinois, were guests of the midwest division of the Salesmens Association of the Paper Industry at the regular Monday noon luncheon at the Hotel Sherman on June 25. Although arrangements for their appearance were made by Lieutenant Steven Grosek, Public Relations Officer at Hines, the five veterans showed up unattended and won the hearts of the large crowd of sales executives and guests with their simple, dramatic and humorous extemporaneous speeches about their experiences. Each effectively demonstrated the American ability to find humor in the most distressing experiences and in lands far removed from their native soil. The veterans were introduced by western vice president Pat Patterson of the Flambeau Paper Company.

On July 16 the next open meeting of the SAPEYES will be held with a moving picture with a splendid advance billing for local showing. The picture is "Careers for Cellulose," prepared and distributed by the Hercules Powder Company, and reported to be a real pictorial achievement in demonstrating the future possibilities of cellulose.

Meanwhile golf chairman Jim Sensenbrenner of Kimberly-Clark Company, is readying the announcements of the final golf outing set for August 8 at the Olympia Fields Country Club. A big attendance is expected partly because of the reputation and location of the club and partly because it is to be the wind-up event. Word from the National Paper Trade Association indicates that possibilities of a Fall meeting of NPTA in Chicago which would make the golf outing a reality, are dimming rapidly.

Form Paper Salvage Club

Pupils of Chicago's elementary schools have formed the "Thousand Pounds" club as a part of efforts to crystalize the importance of summer waste paper drives. The Club was formed at a luncheon held this week by The Chicago Newspaper Publishers Association at which Mayor Edward J. Kelly and school officials heaped praise on twenty-three pupils each of whom collected more than 10,000 pounds of waste paper in the last school year. The twenty-three actually collected 367,000 pounds of paper during that period with the top "collector" bringing in 42,304 pounds and the runner up corraling 30,430 pounds to set the records. The value of the collections totaled $2000. At the same meeting, at which waste paper trade executives of Chicago were among the audience, J. R. Robinson, chairman of paper salvage, announced that the summer playground paper salvage campaign would be extended to all suburbs in Cook county. Three hundred and fifty tons of paper are expected from Chicago playgrounds and an identical amount from the suburbs during the nine week drive. The salvage chairman also paid high tribute to the members of the new Club and said they had set an example for grade school pupils over the entire United States. The Chicago School Board later adopted a resolution commending the spirit of the pupils, thus rounding out a full day in the lives of these patriotic and hard working youngsters.

OPA Waste Paper Amendments

It was reported here locally that recent OPA amendments to the waste paper pricing order, MPR 30, might be helpful in stimulating professional pick-ups in the area. The order, reportedly going into effect September 11, removes the regulation on certain industrial grades of waste paper that a bale must weigh no less than 500 pounds in order to qualify for the differential permitted for machine compressed bales.

New Paper Mill Projected

[FROM OUR REGULAR CORRESPONDENT]

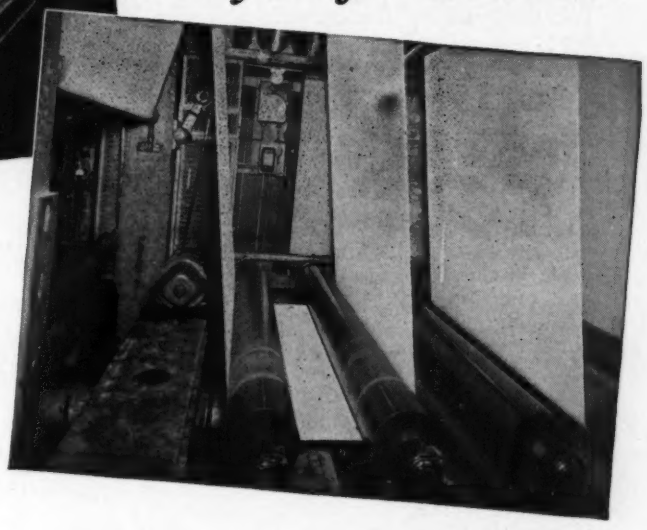
VANCOUVER, B. C., July 2, 1945—Establishment of a new pulp and paper mill on Vancouver Island will be undertaken immediately following the development of new hydro-electric power resources, it was revealed recently by the Honorable John Hart, Premier of British Columbia. The Premier said a large industrial organization had indicated it wants to get a block of from 8,000 to 10,000 h.p. to proceed with the establishment of a new pulp mill. He did not specify which Company, but it is believed the power is required for the projected pulp mill at Port Alberni.

The Premier also revealed that formal decision on the development of a 50,000 h.p. hydro-electric project at Campbell River had now been reached by the B. C. Government, and that this power development would provide the necessary power required for the proposed pulp mill.

NO MANUAL ADJUSTMENTS NECESSARY

in Electrically-Operated Dry Loft Machine

Above—Exterior of Aiken Dry Loft Machine at the Strathmore Paper Co., West Springfield, Mass.



Right—Interior of one section —Type T Heavy-Duty Reliance D-c. Motor in background.

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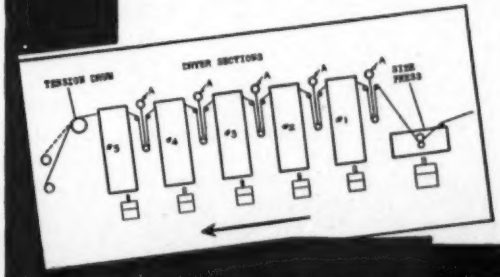

Diagram of 5-section Dry Loft. Each section has a 2 h. p. motor, with dancer-roll rheostat —marked "A". Draw drum and reel have separate motors. All sectional motors in the range operate in a variable-speed V"S System powered by A-c. mill circuit.

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Pulpwood Receipts Up in Year

Total pulpwood receipts of United States mills during May 1945 were approximately 1,461,000 cords, or 13% above May 1944, the Paper Division of the War Production Board reported today.

Total receipts for the first five months of 1945 were about 2% less than during the same period in 1944. Inventories of pulpwood at United States mills have declined 19% as compared with a year ago, WPB Forest Products Bureau said.

Victory in Europe has actually stepped up forest products requirements for military use, WPB emphasized. The pulpwood situation continues tight and the combined efforts of all pulpwood producers are required to increase production throughout the year and keep pace with growing military and essential civilian demands, the Forest Products Bureau added.

WPB outlined the current pulpwood situation as follows:

May receipts of pulpwood produced domestically amounted to 1,311,600 cords or about seven per cent above a year ago and 17% above April 1945.

Domestic receipts during May 1945 in the northeast region were 49% above those of May 1944. However, as a result of abnormally early spring ice "breakups," some wood normally received at the mills in this region at a later time arrived in May and inflated receipts. Northeast mills are in need of the maximum possible production of long-fibered species, such as spruce and fir, WPB's Forest Products Bureau pointed out.

May imports of Canadian pulpwood in the northeast region were approximately 87,600 cords, or about 125% above a year ago. However, for the first five months of 1945, imports in this region were 16% less than during the same period in 1944.

Inventories in the northeast region are 7% below the 1944 levels, 7% below the April level of 1945, and continue critical.

Domestic receipts of pulpwood during May 1945 in the Appalachian region were about 138,400 cords, or about 12% less than in May 1944. Domestic receipts for the first five months of 1945 are 16% below that of January-May 1944. A precarious production situation continues to prevail in this region and heavily increased production of pine, chestnut and other hardwoods is necessary, WPB said.

Pulpwood receipts in the South were about 676,600 cords, or 6% above May 1944 and 11% above April 1945 receipts. Movement of wood to the mills in this region is expected to continue improving during June. However, boxcar shortages may slow down the movement of rail wood during coming months. Car shortages have increased because of troop redeployments and the vast amounts of war materiel shipped from the east to the west coast for prosecution of the Pacific war. If prisoner-of-war labor continues available and its increased daily task rate of production is maintained, pulpwood receipts in the South are expected to mount during the next few months, WPB said.

Union Bag Confers with Brotherhood

GLENS FALLS, N. Y., June 30—Officials of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers and representatives of the Union Bag & Paper Co. are holding a conference here this week at which various matters will be discussed. It is understood that a new wage and working agreement will result.

Reports on Paperboard Situation

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 3, 1945—Approximately 300,000 tons of paperboard have been saved since September 1944 by operation of the War Production Board's limitation order L-239, which controls manufacture of folding and set-up bodes, and revocation of the measure might endanger raw material supplies, members of the Boxboard, Folding Box and Set-up Box Industry Advisory Committees were told at their recent joint meeting, WPB reported today. Order L-239 forbids manufacture of such paperboard items as bottle-carriers, beverage and liquor bottle packages, WPB explained to the three committees.

The agency requested that the industry voluntarily increase containerboard production in the third quarter. Increased manufacture of scarce container liners is necessary, WPB said, and can be attained because of a recent 40,000-ton cutback in ammunition chipboard. Increasing requirements are expected for built-up paper bands that protect bombs while in shipment, Government officials added.

Wood pulp control Order M-93 could be dropped if Swedish pulp imports meet expectations in the third quarter, WPB said. In addition, the possible revocation of M-93 depends, too, on maintenance and intensification of waste paper collections by salvage committees at the present monthly rate of 575,000 tons, WPB emphasized. It was also pointed out that when devastated European countries return to industrial activity, the domestic pulp situation may again grow tight.

The labor situation in the industry is now easing, a WPB spokesman said. However, transportation problems are expected to multiply after September, and continue for six to eight months thereafter. Daily shortages of 5,500 boxcars to handle the general freight traffic situation make impossible any relaxation in boxcar loading requirements, although 1,500 new 50-foot steel cars are being acquired by the railroads each month, he added.

Resins and wax are in short supply, with no immediate relief in prospect at present, WPB said. Appeals by industry for relief should provide WPB with all possible information pertinent to their cases.

The committees recommended unanimously against revocation of Order L-239 now, but will review the order again at the next meeting July 25.

Stein Hall Names McCarron Manager

CINCINNATI, July 3—R. D. McCarron has been appointed manager of the enlarged Cincinnati branch of Stein, Hall & Company, Inc., in Union Central Building. Stein-Hall manufactures and distributes products for the food industry, starches, gums, dextrines, liquid and dry adhesives and other materials used by the paper, food, adhesive and many other industries, and imports burlaps and other commodities.

Mr. McCarron was formerly active in sales and technical service for Stein-Hall in New England and the New York State. He will contact paper mills and paper converters in the Cincinnati territory and handle the company's line of special adhesives. His staff includes C. R. Bachman, in metropolitan Cincinnati; G. C. Bachman, in Cincinnati, Southwestern Ohio, Indiana and Kentucky; W. A. Wilber, in Eastern Ohio, Pennsylvania and West Virginia; H. J. Jones, contacting corrugated board plants in the interests of the Stein-Hall Starch Process for combining corrugated board.

PIPE AND TUBE FITTINGS

- any type - any metal

As specialists in PIPING, Grinnell is your logical source of performance-proved Fittings for every pipe or tubing installation.

The Grinnell line of Pipe Fittings includes screwed, socket, flanged and welding types, in all standard metals. Tube Fittings of Superseal, "AN" Aircraft and S.A.E. designs are available in aluminum, bronze, steel, air furnace malleable and plastics.

Available from your local Grinnell jobber, or from any of the Grinnell branch warehouses listed below.

GRINNELL COMPANY

Executive Offices: Providence 1, R. I.

Branch Warehouses:

Atlanta 2, Ga.	Los Angeles 13, Cal.	Providence 1, R. I.
Charlotte 1, N. C.	Minneapolis 15, Minn.	St. Louis 10, Mo.
Chicago 9, Ill.	New York 17, N. Y.	St. Paul 2, Minn.
Cleveland 14, O.	Oakland 7, Cal.	San Francisco 7, Cal.
Houston 1, Tex.	Philadelphia 34, Pa.	Seattle 1, Wash.

GRINNELL

WHENEVER **PIPING** IS INVOLVED

Samuel Dauman Reaches Sweden

Samuel Dauman, vice-president of Gottesman & Company, Inc. left LaGuardia Airport early last week by American Export Airline Clipper for Sweden. Probably the first representative of an American woodpulp house to visit Sweden since the invasion of Norway in 1939. Mr. Dauman, after a short visit in London arrived in Sweden over the last week-end where he will visit the many connections of Gottesman & Company, Inc. He will make a thorough investigation of existing conditions there and convey to the Swedish manufacturers information concerning the United States market.

Gottesman & Company, Inc. has had its wholly owned subsidiary, Gottesman & Company A/B, Stockholm, in care of its Swedish interests for 25 years and was a pioneer in the importation of Swedish woodpulps long prior to that date. Among the many Scandinavian woodpulp manufacturers represented in the U. S. A. by Gottesman & Company, Inc. are the following Swedish mills: Dynas Aktiebolag, Waija, strong unbleached sulphate; Hylte Bruks Aktiebolag, at Rydobruk, strong unbleached sulphite pulp; Aktiebolag Hogfors Trasliperi, at Haggenas, dry ground wood; Aktiebolaget Iggesunds Bruk, Iggesund, bleached, easy bleaching and unbleached sulphite and sulphate pulps and dissolving pulp; Munksjo Aktiebolag, Aspa Bruk, strong unbleached sulphate; Oskarstrom Sulphite Mills Aktiebolag, at Oskarstrom, strong and easy bleaching unbleached sulphite; Stroms Bruks Aktiebolag, bleached sulphite and dissolving pulps; Svano Aktiebolag, Svanobruk, strong unbleached sulphite; Wifstavarfs Aktiebolag, at Fagervik and Wifstavarf, strong unbleached sulphate pulp and strong unbleached sulphite pulp; Wikmanshytte Bruks Aktiebolag, at Thurbo, bleached sulphite and dissolving pulps; and the Aktieselskapet Saugbrugsforeningen, at Halden, Norway, bleached sulphite and dissolving pulps.

Lt. Proctor on 60-Day Leave

BOSTON, Mass., July 2—Lieutenant Richard Proctor, of the Army Air Force, son of Colonel Charles R. Proctor, head of the Proctor Paper Company, of Lowell and Boston, is now in this country on a 60-day leave. Lieutenant Proctor of the 15th Army Air Force, has seen considerable action. With a number of men, he was shot down March 24 while in a raid from a base in Italy. When heading for Berlin, flak fighters "nailed" them, so that they went down in parachutes about 35 miles southeast of Dresden. Lieutenant Proctor was slightly wounded.

They were taken prisoners and conveyed by train to the Interrogation Center at Weimar. The Yanks started coming along, however, so that the Germans evacuated Weimar and blew up the camp. They escaped at the town of Gars on the Inn River, southeast of Munich. They were taken by truck to Moosburg, Germany, from where they flew to Le Havre and thence to the United States by ship, arriving June 3. The 60-day leave dates from June 5.

R. Collins and H. Timmis Promoted

Richard Collins, for many years mill manager of the Wayagamack division of the Consolidated Paper Corporation, Ltd., Montreal, Canada, has been appointed manager in charge of production of all the mills of the concern.

H. Timmis, has been promoted from assistant to manager of the Wayagamack division.

Wyman Joins Bulkley-Dunton

Walter F. Wyman has joined the paper merchandising division of Bulkley, Dunton & Co., it was announced by J. C. Marvin, head of the division. Wyman has made a great number of friends among printers, lithographers and publishers as a representative of Crocker-Burbank papers for the past 20 years. He joined Clarke and Co., exclusive sales agents for Croker-Burbank in 1925, and when the latter established its own sales agency in 1938, Mr. Wyman continued his activities in selling and promoting the company's papers.

Prior to his association with the paper trade, Mr. Wyman has had 16 years' experience in the export business as sales manager of the Mexican and Central American Department of the United States Steel Export Co. He served as assistant manager of the company's Havana, Cuba office, and the later as manager of their Mexico City office.

Born in Evanston, Ill., Walter Wyman is a veteran of World War I and served with the artillery of the 77th Division in France.

Hamilton Strike Ends

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., July 2, 1945—Employes of W. C. Hamilton and Sons at Miquon, near Conshohocken, ended their 30-hour strike last week, and, according to a company spokesman, agreed to work Sunday to make up for lost production on Army and Navy contracts for blueprint paper.

Settlement of the dispute was announced by Paul Dugan, a personnel director, after a three-hour conference with officials of the industrial Papermakers Union of Pennsylvania, independent, who earlier had said that the walkout was precipitated when a workman, still recuperating from an injury, was told by a foreman that he would have to perform his regular duties, which entail heavy lifting. Mr. Dugan said that the employe, William Hinkle, of Manayunk, had been given a job satisfactory to all parties.

Scott Elects Plowman Vice-President

Francis W. Plowman, general sales manager and a director of Scott Paper Company, was elected a vice-president of that organization on June 28. Plowman is well known throughout the paper industry and in the grocery field. He served as a director of the Tissue Association for several years and is at present a director of the Grocery Manufacturers Association. In his new capacity, Plowman will continue to head the distribution activities of the company.

He became associated with Scott Paper Company in 1928 and has a broad knowledge of the business gained from his experience in a number of its departments. It was while he was in charge of sales research and development that he promulgated many of the company's current sales plans and policies.

G. M. Hobart Made Vice President

TORONTO, Ont., July 2, 1945—George M. Hobart, London, Ont., has been appointed executive vice president of Consolidated Paper Corporation, Ltd., according to an announcement June 25 by L. J. Belnap, president. Mr. Hobart was formerly president of Somerville Limited, London, Ont.

NEW!

NORTON OPEN STRUCTURE Pulpstone

Especially Designed For Making High Freeness Insulating Board Pulp

This new Norton Pulpstone combines the features of OPEN STRUCTURE (large pore space) with the advantages of 38 ALUNDUM abrasive. The result is a stone for board pulp mills that is cooler running and that produces pulp of a higher strength to freeness ratio than that obtained by any previous type of stone.

Improved, too, is the internal construction of this stone. Its new design was developed especially to meet the requirements of today's mills with their high power input, high temperature grinders.

Let us tell you more about this new Norton Pulpstone for operation in insulating board mills.

NORTON COMPANY
Worcester 6, Mass.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending June 30, 1945

STOCKS

	High	Low	Last
A. P. W.	7¼	6⅝	6⅝
Armstrong Cork Co.	47	43⅝	46
Celotex Corp.	17⅛	16¾	16⅝
Celotex Corp. pf.	20¾	20½	20½
Certain-Teed Products Corp.	11¼	10	10¼
Certain-Teed Products Corp., pf.	161	158	158
Champion Paper & Fibre Co.	37¾	35½	36
Champion Paper & Fibre Co., pf.	110¾	110½	110⅝
Congoleum Nairn Co.	30⅛	29½	29½
Container Corp. of America	30	28¼	28¼
Continental-Diamond Fibre Co.	13¾	12¼	12½
Crown-Zellerbach Co.	23⅜	22	22¼
Crown-Zellerbach Co., pf.	104	103½	104
Dixie Cup Co.	29	26¼	26¼
Dixie Cup Co.—A	48¾	48	48
Flintkote Co.	30⅞	28¼	29¼
Flintkote Co., pf.	110	109	110
Robert Gair	7⅛	6⅛	6⅝
Robert Gair, pf.	18¾	17⅝	17⅝
International Paper Co.	29⅜	26	27½
International Paper Co., pf.	98½	95½	96½
Johns-Manville Corp.	126½	120	120
Johns-Manville Corp., pf.	....	....	....
Kimberly-Clark Corp.	48	47½	47½
Mac Andrews & Forbes	33¼	33¼	33½
Mac Andrews & Forbes, pf.	152	152	152
Masonite Corp.	45¼	43¼	44
Mead Corp.	15⅜	14¼	15½
Mead Corp., pf. A—6%	103½	103½	103½
Mead Corp., pf. B—5½%	....	....	....
National Container Corp.	16⅛	15¼	15⅜
Paraffine Companies, Inc.	....	....	....
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	22¾	19⅜	21¼
Rayonier, Inc., pf.	37	36¼	37
Ruberoid Co.	37¾	36¼	37
Scott Paper Co.	49	47	49
Scott Paper Co., pf.	112¾	110¼	110¼
Sutherland Paper Co.	34	33½	34
Union Bag & Paper Corp.	18½	16⅝	17¾
United Paperboard Co.	7⅞	7½	7¾
U. S. Gypsum Co.	94¾	90	90
U. S. Gypsum Co., pf.	191	191	191
West Virginia Pulp & Paper Co.	31⅛	28¾	29½
West Virginia Pulp & Paper Co., pf.	110	110	110

BONDS

Abitibi Pulp & Paper Co. 5s '53	103	101¾	101¾
Celotex Corp. 3¾s '55	104¼	104	104
Certain-Teed Products Corp. 5½s '48	....	....	....
Champion Paper & Fibre Co. 4¾s '50	....	....	....
International Paper Co. 6s '55	107¾	107⅜	107⅜
International Paper Co. 5s '47	104¾	104¾	104¾
Mead Corp. 3½s '53	....	....	....
West Virginia Pulp & Paper Co. 3s '54	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending June 30, 1945

STOCKS

	High	Low	Last
Great Northern Paper Co.	42	41	41
Hummel-Ross Fibre Corp.	9¼	8½	8⅝
St. Regis Paper Co.	7⅞	7	7⅛
St. Regis Paper Co. pf.	....	....	....
Taggart Corp.	7	6½	6½

BONDS

American Writing Paper Co. 6s '61	102	101¾	101¾

Calco Buys Titanium Dioxide Plant

GLOUCESTER CITY, June 23—The Calco Chemical Division of the American Cyanamid Company at Bound Brook, N. J., has purchased, at public auction, plant of the Sherwin-Williams Company. Sherwin-Williams bought and equipped this plant approximately five years ago for experimental production of titanium dioxide. These experiments were recently completed, and as Sherwin-Williams had no further use for the plant, they offered it for sale at public auction.

While no final decision has been made as yet by the Calco management, it is probable that a program will be started to make certain changes in the process that will result in the production of titanium dioxide, utilizing the information and experience gained at its factory in Piney River, Va.

Ames Hettrick, manager of the Piney River plant, will also be the manager of the new plant. The Gloucester City property is presently employing less than 200 people.

Allows Higher Ceiling Prices

Increases have been allowed in manufacturers' ceiling prices on four grades of groundwood specialty papers to help maintain production of the lowest-priced item in each grade, the Office of Price Administration announced today.

None of the papers affected is sold at the retail level.

Examination of the current manufacturing costs of almost all producers shows that existing ceilings are failing to cover the manufacturing costs for a relatively high proportion of the output of these grades, OPA said.

The increases, effective July 9, 1945, that will mean $480,000 more to the industry annually, are 10 cents a hundredweight on No. 1 Groundwood Poster; 20 cents a hundredweight on No. 2 Groundwood Hanging Paper; 50 cents a hundredweight on No. 2 Railroad Manila Paper and 60 cents a hundredweight on No. 2 Groundwood Poster Paper. This represents an average increase of 6.4 per cent.

Approximately 85% of the increase occurs in papers sold directly to wallpaper manufacturers and sales-book converters. Under existing regulations these purchasers are required to absorb the increase.

The remaining 15% of the increase occurs in papers sold directly to fine paper wholesale merchants, who are permitted under their existing ceiling price provisions to pass on this increase in their costs to converters and printers.

Simultaneously with today's increases, the names of four grades of paper are altered. No. 1 Railroad Manila and No. 2 Railroad Manila, previously given ceiling prices of $4.75 and $4.25 a hundredweight respectively, are consolidated into a single grade to be known as Railroad Manila, with a ceiling price of $4.75 a hundredweight. No. 1 Groundwood Poster and No. 2 Groundwood Poster, previously given ceiling prices of $4.75 and $4.25 a hundredweight respectively, are consolidated into the single grade of Groundwood Poster, with a ceiling of $4.85 per hundredweight. No. 2 Groundwood Hanging, previously given a ceiling of $4.00 a hundredweight, will have a new ceiling of $4.20 per hundredweight.

Abitibi Reorganization Drags On

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., July 2, 1945—The submission to the court of the final draft of the reorganization plan for Abitibi Power and Paper Company, Ltd., and the applications for special meetings of security holders will not take place for at least another week, according to a report from Dow-Jones. Probabilities are that when the dates of the meetings are set there will be time allowed for several weeks' notice to the security holders concerned. Under the arrangements made the bond holders will not meet to consider the plan until common and preferred shareholders have considered it. It is unlikely that all groups will have given their approval until well into the autumn, it is said.

Nekoosa-Edwards Votes Dividend

A quarterly dividend of 50 cents per share on capital stock of the Nekoosa-Edwards Paper Company, Port Edwards and Nekoosa, Wis., was announced last week by John E. Alexander, president and general manager, at a directors' meeting. The dividend was paid June 30 to all stockholders of record as of June 20.

Source of "Firsts"

Modern Research Laboratory at Niagara Plant as interpreted by the artist, John Gaydos

THE FACT that Niagara was the first to produce several important electro-chemical products in this country is due in great part to the efficiency of its research. Niagara's research activities are under the supervision of men of long and thorough experience in electro-chemical development, manufacture, and usage. This has enabled Niagara to give valuable cooperation to many industries using such products in the processing of war materials. It will prove of equal value in helping these industries convert efficiently to peacetime manufacture. Look to Niagara for experienced chemical service.

Niagara ALKALI COMPANY

60 EAST 42nd STREET, NEW YORK 17, N. Y.

CAUSTIC POTASH • CAUSTIC SODA • PARADICHLOROBENZENE • CARBONATE OF POTASH • LIQUID CHLORINE

Military Box Needs Set at 300,000 Tons

WASHINGTON, D. C., June 23, 1945—V-box requirements of the military are programmed at 300,000 tons for the third quarter, members of the Containerboard and the Fiber Box Industry Advisory Committee were told at a recent joint meeting, the War Production Board reported today. June allocations have been set at almost 80,000 tons solid fiber and over 12,000 tons corrugated board, WPB said. Total board allocation to the V-box manufacturers during the second quarter amounted to almost 335,000 tons.

Over-all military cutbacks now taking place will release more boxes to essential civilian products later this year, committeemen were told.

Amendments to containerboard Order M-290, of varying degrees of importance, were considered at the meeting. The principal change proposed is the issuance by WPB of incentive authorizations to all corrugated and solid fiber container manufacturers, allowing them to receive additional tonnages of containerboard and thus increase production.

Transportation problems are increasing, due to boxcar shortages, with quantities of pulpwood remaining in the woods instead of being transported to the mills, industry spokesmen pointed out. Pulp and board production will suffer, they said, particularly on the east coast, unless coastwise shipments can soon be reestablished, thus releasing more freight cars.

Waste paper collection campaigns are still vital to the industry, and must be continued during the coming months if programs are to be met, a WPB official emphasized.

Reinhold-Gould Appoints C. V. Morris

Charles V. Morris, prominent paper sales executive, author and editor of Graphic Arts publications, has been named director of trade relations for Reinhold-Gould, Inc., distributors of printing and lithographic papers at 535 Fifth Avenue, New York, by President Harry E. Gould. The appointment of Morris was called "another step in building a postwar organization of utmost service to Metropolitan printers and advertising men."

Morris was identified as former secretary, sales manager and member of the Board of Directors of J. E. Linde Paper Company, and Editor of "Linde Lines," thrice winner of the International Direct Mail Advertising Association's awards for "outstanding achievements in house organ development." Mr. Gould also went on to credit Morris with "creation and direction" of the "Linde Lines" clinics which were considered by the trade as "noteworthy contributions to the welfare of the entire Graphic Arts industries."

For the past three years Morris has been associated with William E. Rudge's Sons, New York printers and publishers, as assistant to the president, and as production chief, and more recently, as promotion executive for the National Association of Manufacturers.

Relates Romance of Paper

A booklet issued by the Fisher Brothers Paper Company, general paper merchants, Fort Wayne, Ind., briefly and interestingly presents the romance of paper.

It is of general interest, giving production data of the various types of paper, raw material consumption, etc. Close-up illustrations of papermaking machinery and charts of output and consumption of paper are included.

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Ed Thom Heads Alliance Pulp Sales

MERRITTON, Ont., July 3—Edward J. Thom, manager of pulp sales for Howard Smith Paper Mills Limited and Canada Paper Company, with headquarters at 407 McGill Street, Montreal, Que., has also been appointed manager of pulp sales for Alliance Paper Mills, Limited, manufacturers of bleached and unbleached sulphite. J. R. Leslie, who formerly handled the sale of Alliance pulp has recently been made

EDWARD J. THOM

Controller of Howard Smith Paper Mills Limited and subsidiary companies and will be located at Montreal. This change will bring under the one direction in the head office of Howard Smith Paper Mills, Limited, the sale and distribution of the various grades of woodpulp made by the Howard Smith organization.

Thom served with the Canadian Army in the first World War, and started in the paper manufacturing business in 1920 with the Beauharnois Division of Howard Smith Paper Mills Limited. In 1927 he was transferred to the pulp department in Montreal and has since been responsible for the sale of groundwood made at Crabtree Mills, Que., bleached sulphite and bleached soda pulp made at Cornwall, Ont., groundwood, bleached and unbleached kraft made at Windsor Mills, Que., and bleached flax pulp made at Beauharnois, Que.

Mr. Thom has travelled extensively in the United States and Canada and is well known to the paper and pulp trade of both countries. He is Chairman of the groundwood (pulp) section of the Canadian Pulp & Paper Association.

Doyle Takes Over Forchheimer Post

W. F. Doyle has been elected vice-president and general manager of the Chatfield and Woods Company of Pennsylvania, succeeding the late Frederick Forchheimer. Mr. Doyle has been with the Company since 1920 and has for many years been sales manager and assistant to Mr. Forchheimer.

San Giacomo Buys Cornwall Mill

CORNWALL, N. Y., July 2, 1945—The Cornwall Paper Mills, Inc., has sold its mill to the San Giacomo Paper Co. of Orange, N. J., as of June 28, 1945.

Sidney Co. To Expand

VANCOUVER, B. C., July 2, 1945—Expenditure of approximately $250,000 on extension to the plant of the Sidney Roofing and Paper Company Ltd. on the industrial reserve at Victoria, B. C., was announced recently by R. W. Mayhew, President of the Company. At the same time Mr. Mayhew said a further $200,000 would be spent in the expansion of the plant of the National Paper Box Company at Vancouver, which is a subsidiary of the firm.

The new section of the Victoria plant will triple the output of roofing materials and will enable the Company to take care of former employees now returning from service overseas. A total of 180 workers are now employed at the plant of the Sidney Roofing and Paper Company. This industry was started in 1914 by six men at Sidney, Vancouver Island, and in 1919 was moved to the industrial reserve adjoining the Victoria city limits.

Mr. Mayhew and his son, Logan Mayhew, Managing Director of the Company, have just returned from Portland, Oregon, where they inspected a similar roofing plant to that which it is proposed to establish at Victoria when the new addition has been added.

Allen Patten Joins Mead Sales Co.

The Mead Sales Company has appointed Allan T. Patton, of Montreal, Canada, to the sales force of its pulp division as of July 15. For the present, Mr. Patton will be located in the New York offices at 230 Park Avenue. He was formerly with the Fraser Industries, Ltd., and has a wide experience in the production and sale of wood pulp. He is the son of the late Jack Patton who for many years was prominent in the industry.

OPA Sets Ceiling Gum Rosin

WASHINGTON, D. C., June 27, 1945—Establishment of dollar-and-cent ceiling prices for sales of gum rosin by producers and dealers was announced today by the Office of Price Administration. Today's action, effective July 2, maintains the present general level of maximum prices for gum rosin, OPA said.

Heretofore, producers and dealers' ceilings have been the seller's most favorable differential during the first six months of 1944 from quotations on the Savannah, Ga., Exchange. The new ceilings translate these "freeze" ceilings into specific maximum amounts for all sales in quantities of 100 pounds or more. Sales of smaller quantities are not under price control.

Specific producers' ceilings for gum rosin range according to grades from $5.05 to $6.55 per 100 pounds net, f.o.b. cars at the shipping point or on Savannah, Ga., yard or an official yard (approved by the Commodity Credit Corporation as a storage or concentration point for gum rosin).

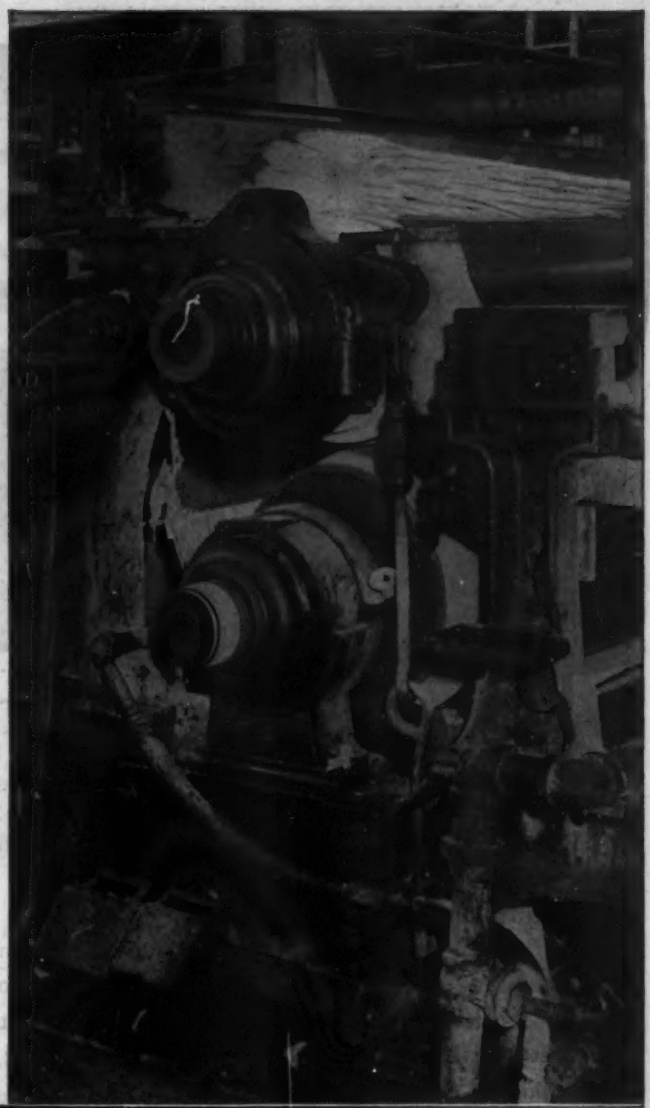
Ceilings for sales at other yards are those specified for official yards, less 3½ cents per 100 pounds net.

Primary dealers' maximum prices are fixed at producers' ceilings f.o.b. cars plus 22 cents per 100 pounds. Such dealers assemble gum rosin from several producers and sell it to industrial users, and secondary dealers.

Ritts Directs VanReekum Operation

A. B. Ritts, secretary-treasurer of the Van Reekum Paper Company has assumed the executive operating duties in the organization that were laid aside recently by H. G. Bengtsson whose resignation as executive vice-president was recently announced.

● *Built by THE CHAMPION PAPER & FIBRE CO., this press section is on a paper machine manufactured by The Black-Clawson Co.*



KEEPING PRESS ROLLS *Rolling!*

When SKF Spherical Roller Bearings go on top and bottom rolls in the press section, several things happen. Rolls are maintained in a definite position, and, because of the ease of driving the top roll, damage to paper stock is eliminated. Drag on the felt is greatly reduced. And so is bearing wear. In the use of SKF Spherical Roller Bearings, paper machinery manufacturers make certain of maximum load carrying capacity . . . equalized load distribution . . . self-aligning properties to compensate for shaft deflections, distortions or weave. Regardless of the nature of your bearing problems, there's an SKF to meet your needs. 5834

SKF INDUSTRIES, INC., PHILA. 34, PA.

SPECIFY

SKF

BEARINGS

HISTORICAL HIGHLIGHTS OF PAPERMAKING NO. 15

Watermarked...A Fool

Until the execution of Charles I in 1649, the finest English paper was watermarked with the royal coat of arms.

After his death, his vengeful successors, the puritans, holding him in complete contempt, substituted for his kingly insignia, a fool wearing a cap and bells . . . a foolscap.

Today, foolscap is a size of paper taken from the dimensions of the sheet on which the fool originally appeared. In the United States it measures 13" x 16⅜"; in England, 13½" x 17".

☆ ☆ ☆ ☆

Here at Cheney Bigelow, we serve the paper industry by supplying it with the best in dandy rolls, cylinders, paper and pulp mill wire cloth and Fourdrinier wires. In addition, we are furnishing our country with vital war material.

CHENEY BIGELOW

Fourdrinier Wires • • Dandys • • Cylinders • • Wire Cloth

CHENEY BIGELOW WIRE WORKS • 417 LIBERTY STREET • SPRINGFIELD, MASS.

Chemical Formulary VII

The seventh volume of the Chemical Formulary by H. Bennett has just been issued by the Chemical Publishing Company (474 pp. 6x9). Many are familiar with the preceding volumes with their thousands of recipes for compounding materials. The main classifications include: Adhesives, emulsions and colloids, food products, inks and marking substances, lubricants and oils, construction materials, metals and alloys, paint, varnish, lacquer and other coatings, paper, plastics, resins, rubber and wax, soaps and cleaners, textiles and fibers, etc.

The paper section occupies four pages and includes tub sizing formulae, defoamers, non-tarnish paper, oil-proofing, coatings, most of which would be of but little value to those in the industry. The book's real value to such individuals is the material contained in other sections where simple recipes are given for many mixtures. Such information is not easily found elsewhere and a book such as this is handy for obtaining quick information on a large number of subjects.

Copies may be obtained from the Book Department of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York 17, N. Y., at $6.00 per copy.

Gets Sixth Navy E Award

For the sixth time in three years, the Navy Department has recognized the excellent production record of Farrel-Birmingham Company plants at Ansonia and Derby, Conn. and Buffalo, N. Y. by the award of the Navy "E".

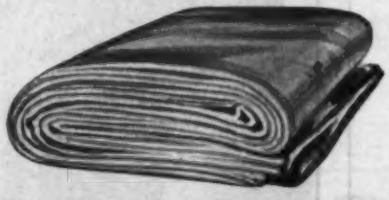
The "E" award, traditional Navy symbol for a job well done, was originally made to the three Farrel-Birmingham plants in Ansonia, Derby and Buffalo, in March, 1942, only three months after Pearl Harbor, and renewed in October 1942, March 1943, September 1943 and March 1944, each renewal adding another white star to the burgees which fly over the company's plants.

The Navy "E" is not only difficult to win, but the renewal stars are equally indicative of an outstanding production record. In addition to making marine gear drives for the Navy and Maritime Commission, the company builds heavy machinery for numerous war plants in the steel, non-ferrous metal, rubber, plastics, paper and other industries.

The Maritime "M" and Victory Fleet Flag were awarded the three plants last fall for their work for the Maritime Commission.

If it is KRAFT . . .
it must be Strong

The word *kraft* means strength . . . capacity for doing work. A craftsman is a working man—a kraft paper is a working sheet—strong, tough, with long fibered "muscles" in closely-knit formation and full of life. Cooking capacity of the digesters must be balanced by the speed of the paper machines. Drying must be uniform and fast. Experienced paper manufacturers rely upon Hamilton Felts to give their sheets the strongest possible formation and to reduce drying time to lowest possible terms. No matter how great the pressure or how high the speed, Hamilton Felts remove more water without "picking." They reduce broke and prevent down time for adjustments . . . . they save steam at the drier rolls . . . . they give maximum *kraft* to any furnish.



From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

• Established 1858 •

Frederick Forchheimer Dies

PITTSBURGH, Pa., June 25, 1945—Frederick Forchheimer, nationally known in the paper industry died suddenly June 22nd, at his home on Dorseyville Road, Fox Chapel. He was 58. Mr. Forchheimer was vice president and general manager of The Chatfield & Woods Company of Pennsylvania. He came to Pittsburgh in 1921, and had been associated with the firm for 35 years.

Born in Cincinnati on July 7, 1887, he was the son of Edith Perry and Frederick Forchheimer, who for many years was dean of the medical school of the University of Cincinnati. He was educated in Cincinnati public schools. Later, he attended St. George's Preparatory School and Harvard University. He served as a first sergeant during World War I.

He was a member of the Queen City Club at Cincinnati; the Pittsburgh Field Club, and the Pittsburgh Athletic Association.

Surviving him are his widow, Marie Emrick Forchheimer; a sister, Frances E. Perry of Camden, Maine, and a brother, Landon L. Forchheimer, a former judge of the Cincinnati Court.

Bratton Resigns From Pusey & Jones

Samuel M. Bratton has resigned as chief engineer of the paper machine division of the Pusey and Jones Corporation at Wilmington, Delaware. He was first employed as a draftsman in 1917 becoming assistant chief engnieer in 1930 and chief engineer in 1934. He was previously employed by the Hilles and Jones Company, now affiliated with the Consolidated Machine Tool Company. Mr. Bratton has not announced any plans for the future.

More Paper for Sacks Authorized

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., July 3, 1945—An increase of approximately 18,000 tons of paper for paper shipping sacks over any previous authorizations, because of additional demands by claimant agencies, is included in third-quarter allocations, members of the Paper Shipping Sack Industry Advisory Committee were told at their recent meeting, the War Production Board reported today.

WPB's Requirements Committee has authorized the use of approximately 108,000 tons of kraft paper for paper shipping sacks, but it is hoped that increased production by some mills will furnish total of 119,000 tons of kraft paper required and 17,000 additional tons of asphalt laminated paper, members were told.

Claimant agencies included in the disposition of the record tonnage of shipping sack paper are the armed forces, the Rubber Reserve Company, War Food Administration, Foreign Economic Administration, United Nations Relief and Rehabilitation Administration and several divisions of the W.P.B.

The supply of asphalt laminated paper for shipping sacks is currently tight, but cutbacks on military production and additional production may help supply the full amount of 17,000 tons required, WPB said.

Industry members discussed the paper shipping sack order, L-279, which was amended May 25, 1945, to restrict the use of paper sacks for shipping apples, pet foods or dessert preparations in larger amounts than commercial users consumed in 1944. The amended order also permits paper-shipping-sack use for certain chemical and agricultural products.

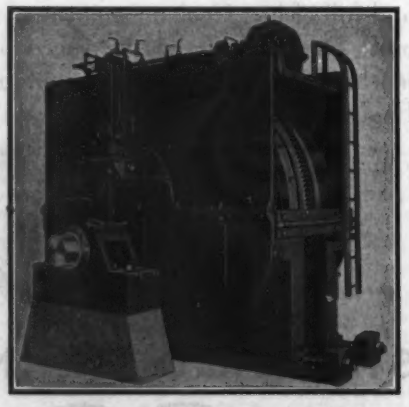
Procurement of bread sacks for use by the Army in shipping baked goods to civilians in liberated European areas was also a subject of discussion.

GRINDS UP TO 50 TONS OF PULP A DAY

The Roberts Grinder produces more pulp per square foot of floor area than other grinders. This highspeed, continuous grinder manufactures up to 50 tons of groundwood pulp every twenty-four hours. It is a compact, self-contained unit of large capacity. Continuous feeding and grinding is more efficient and more economical. There is no drop or peaking of the load.

High-speed grinding increases the pulp output per unit. One Roberts does the work of three or four pocket grinders. The wood contacts the stone over a wider area than in other equipment. This greater grinding surface permits the use of more power per unit for greater pulp production.

The Roberts Grinder produces better grades of stock at any freeness with closer uniformity in the quality and consistency of the stock. Slivers in the pulp are reduced to a minimum due to the installation of a shim catcher and subsequent regrinding. Pulp quality is easily controlled. There is less waste. The Roberts Grinder provides improvements from every angle in the manufacture of groundwood pulp. Highspeed, continuous grinding means greater tonnage at lower cost per ton. Write now for complete information.



ROBERTS *Continuous* GRINDER

THE APPLETON MACHINE COMPANY

APPLETON • WISCONSIN

Eastern Sales Representatives: CASTLE & OVERTON, Inc., 630 Fifth Avenue, New York

HOW TO AVOID LOSSES AT THESE 7 DANGER SPOTS IN YOUR MILL

IN LOG STORAGE

Stains originating in rot and fungi in pulp logs can be prevented by application of a one to two per cent water solution of Santobrite. Logs, peeled or with bark on, can be dipped in the solution or sprayed with it in the woods or upon unloading at the mill.

IN SLIME IN MILL SYSTEM

Microbiological activity causing slime spots and breaks, blinded wires and plugged felts, obstructed stock and water lines, and stock losses can be effectively combatted by using 0.1 to 1.0 pound of Santobrite per ton of product made.

IN STORED PULP LAP

Rotting, staining, specking and sliming of chemical or mechanical wood pulps in damp storage can usually be prevented by incorporation of 2 to 4 pounds of Santobrite per ton of dry fibre.

IN ROTTED FELTS

Santobrite is toxic to degrading micro-organisms responsible for rotted paper machine felts. It is recommended that felts be impregnated with a 0.5% to 1.0% solution (by spray) when shutting down.

IN SPOILAGE OF STOCK

Decomposition of board stocks, with disagreeable odor arising therefrom can be prevented usually by the addition of 0.5 to 1.0 pounds of Santobrite per ton of dry fibre.

IN SPOILAGE OF SIZE

Protein, glue and starch sizing and coating materials, subject to attack by molds and bacteria, can be satisfactorily preserved by the use of 0.5% to 2.0%.

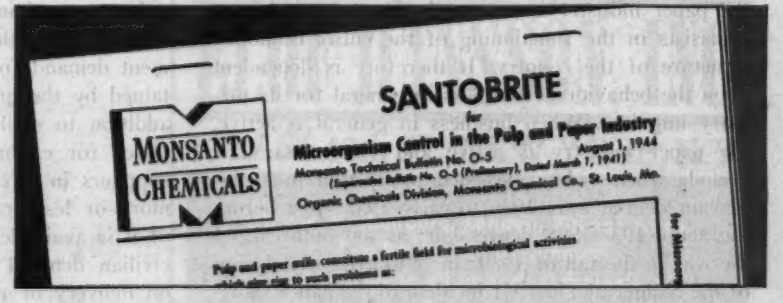
IN MILDEWING OF FINISHED PRODUCTS

Boxboard and board used for egg case fillers and flats, etc., may be protected against mildew by incorporating Santobrite in amounts varying from 0.05% to 1.0% of the weight of the fibre.

The use of Santobrite (sodium salt of pentachlorphenol) for control of paper mill micro-organisms has been proved in practical mill application for years. Few if any mills require all these applications, but few, on the other hand, could not profit by the use of a number of them.

Santobrite is chemically stable, non-corrosive to equipment, non-volatile, comparatively odorless, and properly handled, is easy and safe to use.

For complete information on Santobrite for your mill, write for Technical Bulletin O-5, "Santobrite for Micro-organism Control in the Pulp and Paper Industry"; MONSANTO CHEMICAL COMPANY, Organic Chemicals Division, St. Louis 4, Missouri.
District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Seattle, Montreal, Toronto.



PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger, Editor

COMING EVENTS IN PAPER INDUSTRY

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

EMPIRE STATE SECTION. Technical Association of the Pulp and Paper Industry—Second Thursday of each month at the Woodruff Hotel, Watertown, N. Y.

CHICAGO PROFESSIONAL PAPER GROUP. Third Monday of each month except July and August at Chicago Bar Association, Chicago, Ill.

PAPER OUTPUT AND ORDERS

Paper production for the latest recorded date, June 16, was set at 91.5% of estimated six-day capacity. This relatively high output compares with 95.5% in 1944 and 1943, with 86.5% in 1942 and with 99.9% in June 21, 1941. In commenting on paper production and new orders, the latest bulletin of the American Paper and Pulp Association states in part that, the first five pre-war years witnessed the N.R.A., the revaluation of the dollar and practically all of the New Deal measures. In 1937 this industry suffered a sharper and more extensive decline than has occurred in any year since World War I. It was barely recovering from this when the world was again plunged into war in 1939.

In reference to the law of balance the Association report states that, in a relatively free economy with the forces of supply and demand operating freely, orders and production tend to reach a balance. If orders increase, production follows as fast as it can with the facilities at hand. If it is not increased fast enough to balance the new orders received, shipments must be made from stock on hand or unshipped orders will pile up until orders slack off or production finally catches up through capacity increases. Meanwhile, the orders-production balance is disturbed by heavy unshipped orders on hand at the mills. Price movements are always important elements in these situations. In pointing out the limit of application, the report goes on to explain that, the paper industry is essentially a service industry. It assists in the functioning of the entire economic structure of the country. It therefore is dependent upon the behavior of business in general for its primary impulses. When business in general is active, the paper industry is active and vice versa. The periods when orders exceeded production to a significant degree were 1936 to early 1937; just before the acute 1937-1938 depression; at the outbreak of the war in the fall of 1939; in 1940 after the closing of the Skagerrak; in 1941 incident to the paper shortage scare, and prior to the issuance of the major limitation orders on paper consumption. Each of these periods except the last was followed by a sharp recession in orders accompanied by a sharp drop in production. The 1937 drop was affected by a major drop in general business while the major influences in the other three disturbances were from within the paper industry itself. The resulting "readjustment decline" in each case was almost directly in proportion to the excessive ordering that preceded it. A build up of unshipped orders and a slight decrease in stock on hand is characteristic of the first phase of these disturbances. In the second phase, unshipped orders drop and stock on hand builds up as new orders and production drop. Since the fall of 1942, war influences and controls have been dominating the behavior of these series. Rigid price control has effectively prevented speculative buying. Government requirements have taken a sizable part of the production of the industry. Labor shortages have curtailed pulpwood supply and have increased the cost of production in many ways. Civilian consumption has been curtailed by limitation orders. Delivery of machinery and equipment has been restricted and new construction has practically ceased.

Commenting on the effect of war, the report points out that, under these circumstances production has been maintained with difficulty at a rate that varied between 80% and 89% of capacity. After allowing unshipped orders to reach approximately 85% of monthly capacity, and also drawing down stock on hand to about 25% of capacity, new orders have been accepted only at the approximate rate of production. Consequently unshipped orders have been maintained at a high level for over two years, while stock on hand has decreased to what must be rather close to a minimum. In the meantime production has been moving horizontally at about 85% of capacity. With the close of the war in Europe, it seems reasonable to expect, the report continues, an easing of some of the restraints on the production of paper that have existed during the last two years. Some European pulp will in all probability reach here soon. In the meantime the labor supply should become easier because of Army discharges and cutbacks in certain war production schedules. The increased labor supply should somewhat ease the pulpwood situation so that domestic pulp mills will have more pulp available. It seems probable, therefore, that more paper will be available for distribution by the mills.

In summarizing the factors of demand the report states that, on the demand side much of the government demand for paper, we are told, will be maintained by the prosecution of the Japanese War. In addition to civilian demand, a sizable demand for paper for export is being presented constantly to suppliers in this country. While this is liable to be more or less transient business, nevertheless much of it is available "cash on the line". The unsatisfied civilian demand is sizable and urgent. Restrictions on delivery of new machinery and equipment have been relaxed and the industry has demonstrated that

given the raw material it can produce 15 to 20% more than at present even with present equipment. It is possible that this might be exceeded owing to wartime improvements and efficiencies that have developed. With low stock on hand, high unshipped orders, and increasing supplies of raw material and labor it would seem that the paper industry is in a position to "deliver" but the mills could maintain to advantage their present conservative attitude with respect to taking on new orders.

In conclusion the report emphasizes that, should some disturbance to general business develop, such as acute reconversion troubles, or disturbing international difficulties in either the political or the economic sphere, the repercussion will soon develop in this industry.

Behr-Manning Adds a Wing

WATERVLIET, N. Y., June 30—A new addition is being built at the plant of the Behr-Manning Corporation, which will be used for cafeteria purposes. The new structure is in line with the extensive wartime development being carried on by the firm and is expected to be ready for occupancy within a few weeks. All modern conveniences are being installed and provisions are being made to care for 1,500 employes. Government contracts are continuing to necessitate overtime schedules but plans are under way for the post-war period. The plant here is now employing the largest force in its history.

Woolsey Weed in Safety Council

ALBANY, N. Y., June 30—Among the directors of a newly reorganized Albany Safety Council is Woolsey W. Weed, of F. C. Huyck & Sons. The directorate is composed of twenty-four men prominently identified with industrial and business organizations.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1945		Corresponding Weeks—1944	
May 19	92.5	May 20	90.7
May 26	92.0	May 27	90.0
June 2	87.9	June 3	86.1
June 9	92.8	June 10	90.7
June 16	91.5	June 17	91.5
June 23	90.4	June 24	90.8

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Yrs. Avg.
1944	88.7	88.5	88.1	87.6	88.7	89.8	80.3	90.6	88.2	92.5	90.6	82.4	88.1
1945	86.7	89.4	90.2	88.1	89.8								

COMPARATIVE YEARLY SUMMARIES

	1938	1939	1940	1941	1942	1943	1944	1945
Year to Date	67.4	79.5	87.0	93.5	99.1	88.8	88.6	88.9
Year Average	71.5	83.4	85.6	97.4	90.4	87.8	88.1	

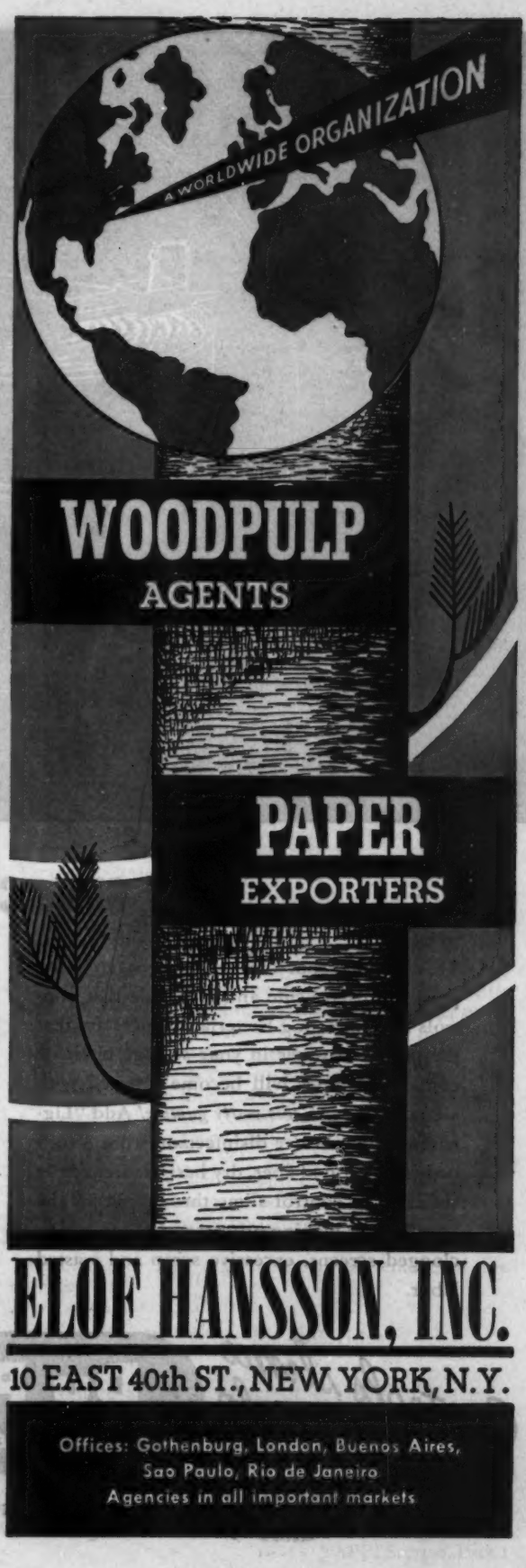
* Based on tonnage reported to American Paper and Pulp Association Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Current Weeks—1945		Corresponding Weeks—1944	
May 19	97	May 20	97
May 26	97	May 27	96
June 2	93	June 3	93
June 9	97	June 10	96
June 16	96	June 17	95
June 23	96	June 24	96

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Yrs. Avg.
1944	90	96	95	96	96	96	85	96	92	95	95	85	93
1945	91	95	97	97	96								

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.



Start Slime Control Here!

This is the "spot" to add "Lignasan"—the powerful bactericide and fungicide that controls slime-forming bacteria. Chances are that the pulp and water in your storage chest or connecting pipes will become infected with slime. *Don't risk this costly gamble!* Add "Lignasan"! As a beater disinfectant, from 3 to 5 ounces per ton of fiber, dry basis, is frequently sufficient to control slime throughout *all* the "wet" paper-making processes. Puts an end to clogged screens, excessive scrap and wasted labor.

Use "Lignasan," too, as a spot treatment wherever slime persistently forms. As little as 3 to 5 ounces of "Lignasan" per ton of fiber, dry basis, bled into the head-box prevents the formation of slime on the paper machine.

Get the facts today on how "Lignasan" can help you control slime, preserve pulp, prevent clogging of alum lines and keep your mill operating at *top* efficiency. Write our nearest branch office or E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware.

Controls slime
Preserves pulp

Du Pont Lignasan

BACTERICIDE AND FUNGICIDE

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Water–Soluble Sulphates and Chlorides in Pulp*

TAPPI Tentative Standard T 229 m-45

This method is applicable to the determination of the small quantities of water-soluble chlorides and sulphates normally existing in pulp. It is not designed for analysis of pulp containing 1% or more of water-soluble sulphate. Since the amounts to be determined are small, it is important that the determinations be conducted in an atmosphere free from contaminating materials.

Reagents

A. *Barium Chloride Solution*, approximately 10%. Dissolve 100 grams of $BaCl_2.2H_2O$ in distilled water and dilute to 1 liter.

B. *Silver Nitrate Solution*, approximately 5%. Dissolve 5 grams of $AgNO_3$ in distilled water and dilute to 100 ml. This reagent is for the gravimetric chloride method.

C. *Standard Silver Nitrate Solution*, for volumetric chloride method. Dissolve 2.5 grams of $AgNO_3$ in distilled water and dilute to 1 liter. Standardize on 0.03-gram portions of C.P. NaCl by dissolving in water and titrating as described below under procedure. 1 ml. = approximately 0.0005 gram Cl.

D. *Potassium Chromate Indicator*, approximately 5%. Dissolve 5 grams of K_2CrO_4 in distilled water and dilute to 100 ml.

Test Specimen

Separate a representative sample of the pulp into thin plies and then cut into pieces approximately 1 cm. square. If the pulp is wet, let the pieces come into approximate moisture equilibrium with the air before weighing out samples for analysis.

Procedure for Sulphates

Extraction

Weigh out 5 grams of the prepared specimen (*see* note) to the nearest 10 mg. and transfer to a 500-ml. Erlenmeyer flask. Add 250 ml. of boiling distilled water, attach a water or air condenser to the flask, and boil gently for 1 hour. It is desirable to use a ground-glass connection between the flask and the condenser rather than a cork or rubber stopper, on account of the possibility of contamination from the latter. Instead of using a condenser, the flask may be covered with a small watchglass to retard evaporation, replacing evaporated water at intervals.

Filter the contents of the flask through an ashless filter paper in a Büchner funnel, return the pulp to the flask, add another 200 ml. of boiling water to the pulp and again extract for 15 to 30 minutes. Filter through the funnel and paper previously used, and wash the extracted specimen and filter paper with 50 ml. of hot water in small portions.

Run "blanks" on the water for each series of specimens tested at one time, putting the blanks through the same operations as the test specimens.

Note. If both sulphates and chlorides are to be determined, only a single specimen is necessary. Weigh out 10 grams of the sample, transfer to a 1-liter flask, add 500 ml. of boiling water, and extract as described above. A second extraction with 400 ml. of water and washing with 100 ml. of water are also carried out as described above. Thoroughly mix the filtrate and washings and divide into two equal parts. (Careful measurement in a graduate is satisfactory.) Determine sulphates on one portion and chlorides on the other.

Determination

To the combined filtrates add 1 ml. of conc. HCl, heat to boiling, and add dropwise with stirring 5 ml. of 10% $BaCl_2$ solution. Digest at approximately 80°C. for 4 hours or longer, filter on a fine-grained, ashless filter paper and wash free of Ba salts with hot water (until the filtrate gives no test for Cl upon addition of $AgNO_3$ solution.) Transfer the filter paper and contents to a tared crucible, ignite slowly at first with free access of air to prevent reduction of $BaSO_4$ by the filter paper, and then at 800 to 900° C.; cool and weigh. Carry out a blank test in the same way on the same amount of water and reagents and subtract any $BaSO_4$ found. Filtration may be made in Gooch crucibles with previously washed and ignited asbestos mats or porous porcelain crucibles, in which case there is no danger of reduction by the filter paper. Calculate the weight of $BaSO_4$, minus the blank, to SO_4 and report as percentage of the air-dry pulp.

Calculation: $BaSO_4 \times 0.4115 = SO_4$.

Procedure for Chlorides

Extraction

Prepare a water extract of 5 grams of the pulp according to the procedure for sulphates.

Volumetric Method

Combine the filtrates. If the extract is not neutral to litmus paper, adjust to neutrality with very dilute HNO_3 or chloride-free NaOH. Add 5 ml. of 5%

* This method has been approved as a tentative standard by the Chemical Methods Committee. Criticisms are earnestly requested and should be sent to R. G. Macdonald, Secretary, Technical Association of the Pulp and Paper Industry, 122 E. 42nd St., New York 17, N. Y. Reprints of this standard may be obtained from the Secretary at 25 cents each.

K_2CrO_4 solution as indicator, and titrate with the standard $AgNO_3$ solution (1 ml. = 0.0005 gram Cl) to the first appearance of the brick-red color of silver chromate. The titration should be performed in a white porcelain dish or casserole, or over a white surface. Use as a standard for comparison of color at the end point a determination performed similarly and to which subsequently a slight excess of soluble chloride has been added. The first difference in color between the comparison standard and the solution being titrated denotes the end point. The titration may be performed under a Mazda lamp.

Carry out a blank determination on the same amount of the water as used for extraction of the pulp and subtract the volume of $AgNO_3$ required for the blank from that used for the titration of the pulp extract. From the difference calculate the percentage of chlorides (Cl) in the air-dry pulp.

Gravimetric Method

To the combined filtrates, add 1 ml. of conc. HNO_3 and heat the solution to boiling. Add slowly with constant stirring 5 ml. of 5% $AgNO_3$ solution. Keep the solution hot and stir frequently until the AgCl is coagulated. Filter through a previously prepared, dried and tared Gooch crucible. Wash the crucible and precipitate with 100 ml. of dilute HNO_3 (1:100), or until the washings are free of $AgNO_3$, and finally with two portions of water. Dry the crucible and contents at 130°C. to constant weight. Calculate the content of chlorides (Cl) as percentage of the air-dry pulp, after subtracting any Cl found in the blank run under the same conditions.

Calculation: $AgCl \times 0.247 = Cl$.

TAPPI Notes

Donat Arsenau, formerly of the Ste. Lawrence Paper Mills is now chemist for Sorel Industries Ltd., Sorel, P. Q.

George K. Storin has been transferred from the research department to the technical sales department of the Niagara Alkali Company, Niagara Falls, N. Y.

J. C. W. Evans, formerly of the Consolidated Paper Company is now with the Technical Section of the Canadian Pulp and Paper Association, Montreal, P.Q.

J. B. Porter, Vice President and General Manager of the D. M. Bare Paper Company, Roaring Spring, Pa., has replaced T. L. Gartland (deceased) as official representative of his Company in the Technical Association of the Pulp and Paper Industry.

Elmer K. Stilbert, plastics engineer for the Dow Chemical Company has been transferred from Philadelphia to Midland, Mich.

Paul E. Alexander, research chemist for the American Can Company has been transferred from San Francisco to 4875 Santa Fe Avenue, Los Angeles, Calif.

E. Russell Long, chemist for the Hall Laboratories, Los Angeles, Calif., is now a service engineer for the same company.

R. O. Lindsey, chief chemist for the Consolidated Paper Company Ltd., Grand Mere, P. Q., will become technical sales representative for the American Cyanamid & Chemical Corporation, 89 Broad Street, Boston, Mass., on July 16th.

H. L. Hayes, Vice President and General Manager of the St. Croix Paper Company, Woodland, Maine, has succeeded L. J. Parant as official representative of his Company in the Technical Association of the Pulp and Paper Industry.

Dr. Shirley Appointed to Syracuse

Dr. Hardy L. Shirley, director of the Northeastern Forest Experiment Station, U. S. Forest Service, Philadelphia, Pa., has been appointed assistant dean of the New York State College of Forestry at Syracuse University. Dr. Shirley will take up his duties at the College September 1. His appointment is the result of an extensive canvass of available men by the Board of Trustees to fill the vacancy caused by the resignation of Assistant Dean Clyde Leavitt November 1, 1943.

Born in Orleans, Ind., B. A. from Indiana University in 1922, and Ph. D. from Yale University in 1928, Dr. Shirley taught in the high school at Kendallville, Indiana, was assistant professor in mathematics, University of Nevada; and instructor in dendrology and mensuration, Yale School of Forestry. He was assistant in bio-chemistry, Boyce-Thompson Institute, Yonkers, N. Y., and senior silviculturist at the Lake States Forest Experiment Station, U. S. Forest Service. He became Director of the Allegheny Forest Experimental Station, October 16, 1939, with headquarters at Philadelphia, and on May 1, 1945, succeeded to the directorship of the renamed Northeastern Forest Experiment Station.

Dr. Shirley was sent on a special mission to Europe by the U. S. Forest Service and the Oberlander Trust to study forest tree seed testing and seed certification in 1935. This was followed by a special mission in 1937 to Puerto Rico, Virgin Islands and Trinidad to study the need for forest research in tropical America, and to outline a program for such research. The establishment of the Tropical Forest Experiment Station in 1939 followed the recommendations made by Dr. Shirley at the conclusion of his survey.

He is a member of 14 scientific and professional societies among which are the Council of the Society of American Foresters and the Executive Board of the Pennsylvania Forestry Association; also Phi Beta Kappa and the Society of Sigma Xi. Dr. Shirley is author of some forty reports and special articles. Among his later publications are special reports on opportunities in forestry, and forestry in the postwar world.

New TAPPI Members

Alain Bargilliat, Printing Engineer, Office Technique de L'Imprimerie, 115 Boulevard St. Germain, Paris 6, France. Attended Ancien Elieve del Ecole Polytechnique Chasente, Maritime, France.

Y. S. Chaudhary, General Manager, Bombay Paper and Board Mills, Tilaknagar Dt. Ahmednagar, India. Attended Altenburger Technical Institute, Altenburg, Germany.

Joseph C. Clark, Jr., Chemical Engineer, West Virginia Pulp and Paper Co., Charleston, South Carolina, a 1943 graduate of the Institute of Paper Chemistry.

Morris D. Douglas, Vice-President, The Cleveland Container Co., 10630 Berea Road, Cleveland 2, Ohio, a 1913 graduate of Lehigh University.

Ray N. Hollands, Paper Technician, Marathon Corporation, Menasha, Wisconsin.

Lian Po Hsiao, Professor of Chemical Engineering, National Northwestern College of Engineering, Kulupu, Chengku, Shensi, China, a 1925 graduate of the University of Illinois.

Byron M. Shinn, Assistant Head, Chemical Research and Development Dept., Armour & Co., Chicago 9, Illinois, a 1924 graduate of the University of Illinois.

Laminants and Coatings for Papers, Plastic Films and Metal Foils*

By F. B. Speyer[1]

Abstract

The application of laminating and coating compositions to papers, plastic films, cloths, metal foils, and nonflexible materials has rapidly evolved from an art to an ever expanding specialized science. This paper discusses the methods which have been shown most satisfactory for using specific formulations with various packaging materials. A concise study of surface coatings, hot melts, and laminating adhesives is presented. Correlations are drawn between the properties of various formulations and the properties of some base surfaces, showing how a scientific knowledge of the physical and chemical properties of available formulations eliminates guess work in choosing the best combinations. In many instances, however, combinations have shown astonishing results when there was no apparent scientific explanation, but these cases are the exception.

Compatibility between base resins, plasticizers, and solvents, as well as between plastic films and adhesive composites can be generally predicted on the basis of agreement or likeness in molecular size and structure, special arrangement, atomic structure, and physical and chemical properties. A formulation may be made up simply by mixing two or more materials together, by reacting compounds together, or by any combination of the two methods. The blending together of two or more materials is generally accomplished when there is a similarity in component parts.

In formulating, it is well to keep in mind the various types of materials which may be incorporated into a formula to give special properties. Table I presents a list of such materials. Table II presents a list of specifications which may be achieved and may be considered a check list for evaluating the usefulness of a particular formula.

Lacquer Coatings

Coatings are designed to impart to a surface protection, decoration or a means of combining, as by heat sealing, to a second surface. Table III presents a list of typical surfaces to which adhesion of a resinous composite is commonly sought. Protection to a surface is brought about by imparting the characteristics of the covering film. A purely decorative coating is designed to enhance the eye appeal of the material to which it is to be applied, however, this property is usually combined with that of surface protection. Decorative films may be designed to increase gloss, luster, or brilliance to the surface or to impart color, fluorescence, odor, or even taste. In short, any property of a coating which enhances, accentuates, or in any way adds to the basic design and character of the surface, distinguishes the coating as decorative in nature.

Surface coatings may be applied by brushing, calendering, dipping, spraying, or by a coating machine.* The choice of coating methods depends both upon the physical and chemical properties of the lacquer (any resin-solvent system is in this paper considered a lacquer) and upon the type of surface to which application is desired. The most rapid and uniform method is by use of a coating machine. The speed at which the machine is run depends upon the viscosity of the lacquer, the rate of solvent release, the amount of lacquer to be applied, and the type of machine used. Spraying may be used to advantage on rigid or discontinuous surfaces when the fluidity of the lacquer permits. Both heated and cold lacquer sprays are used; the former has the advantage of faster drying resulting in less running. Pieces of leather, paperboard, metal, and other discontinuous surfaces can be sprayed to advantage. Most of the smooth surfaces satisfactory for spraying can be brushed, but this is a slower method and often results in streaks. Usually only solutions too heavy or stringy for a spray gun are brushed. Dipping requires little technique and affords a rapid method for completely coating small objects. Calendering is another rapid method for continuous coating but finds limited application.

Hot Melts

Hot melts may be formulated for use either as coatings or as laminants. As coatings they must necessarily be more tack free to eliminate blocking against either like or unlike surfaces, except in such rare cases where this is desired, such as on fly papers. Blocking is a major problem since coated papers, films, and foils are usually stored and shipped in rolls or piled one on top of the other. Rigid specifica-

TABLE I.—MATERIALS USED IN RESINOUS FORMULATIONS

Base Ingredients	Solvents	Plastifying Agents	Miscellaneous
Resins	Organic solvents	Plasticizers	Tackifiers
Rubbers	Water	Oils	Emulsifiers
Asphalts	Acids	(Vegetable)	Curing agents
Waxes	Alkalies	(Mineral)	Thickeners
Starches	Ammonia	(Animal)	Pigments
Lignin		Greases	Dyes
Casein		Liquid polymers	Antioxidants
Zein			Binders
			Inorganics

TABLE II.—SPECIFICATIONS

Resistance to Physical Effects:
1. Shock, 2. Abrasion, 3. Tear, 4. Flame, 5. Heat, 6. Electricity, 7. Infra red and ultra violet rays, 8. Volatilization, 9. Settling (precipitation or coagulation).

Resistance to Chemical Deterioration:
1. Water and water vapor, 2. Organic solvents, 3. Acids, 4. Alkalies, 5. Grease and oils, 6. Oxidation, 7. Gases (O_3, O_2, Cl_2, CO_2, etc.), 8. Other chemicals.

Miscellaneous Properties:
1. Color, 2. Odor, 3. Taste, 4. Toxicity, 5. Flexibility, 6. Resistance to attack of microorganisms, 7. Viscosity, 8. Adhesion, 9. Cohesion, 10. Hardness.

Properties Specific for Coatings:
1. Block point (p.s.i./°F./24 hr./% R.H.), 2. Heat sealability (maximum seal strength when sealed at °F. gives bond of lb./in.), 3. Gloss and slippage.

Properties Specific for Laminants:
1. Pressure sensitivity, 2. Solvent retention.

Properties Specific for Hot Melts:
1. Melting and softening point, 2. Temperature at application fluidity.

Sales Specifications:
1. Cost, 2. Availability, 3. Applicational equipment, 4. Shipping containers.

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] American Resinous Chemicals Corp., Peabody, Mass.

* For an excellent discussion of laminating and coating equipment by Oscar DeSylva, refer to *Modern Packaging* 17, 117, No. 12 (1944).

TABLE III.—VARIOUS SURFACES TO WHICH ADHESION IS COMMONLY SOUGHT

Papers	Plastic Films	Metal Foils	Miscellaneous
Kraft	Casein	Aluminum	Clay
Sulphite	Cellulose	Copper	Cloth
Glassine	Cellulose acetate	Lead	Cork
Rag	Cellulose acetate butyrate	Nickel	Glass
Asbestos	Cellulose acetate propionate	Tin	Leather
Parchment	Cellulose nitrate		Metals
	Cellulose nitrate acetate		Mica
	Ethyl cellulose		Porcelain
	Gelatin		Stone
	Methyl methacrylate		Wax
	Nylon		Wood
	Polystyrene		
	Polyvinyl alcohol		
	Polyvinyl alcohol acetate		
	Polyvinyl butyral		
	Polyvinyl chloride		
	Polyvinyl chloride acetate		
	Polyvinylidene chloride		
	Polythene		
	Rubber		
	Rubber hydrochloride		

tions in regard to both temperature (°F.) and pressure (p.s.i./24 hr.) are prime requisites of hot melt coatings. Blocking is also affected by humidity factors, high humidities invariably causing a lowering of the block point. On the other hand, heat sealability may be desired, and this is in itself a fusion or blocking of one surface to another. The optimum condition would be a surface whose seal strength was at a maximum when sealed at a temperature just above that where no blocking occurred at the greatest load. Heat sealability is a function of the following factors: 1. Type of resin, 2. type and amount of plasticizer, 3. type and amount of antiblocking agent, 4. type and amount of other incorporated materials, 5. solvent retention, 6. temperature, 7. pressure, and 8. time of dwell.

Hot melts must be formulated not only with regard to meeting the specifications of a finished product but also to conform to methods of application. Thus, flow temperature, viscosity, decomposition, volatilization, stringiness, storage containers, and other such factors must be considered.

A second type of hot melt is the heat and/or pressure sensitive type. When lamination immediately follows coating, blocking need not be considered. The greatest advantage of pressure sensitivity, whether application is made from a solution or as a hot melt, is better low temperature flexibility. When equipment is available, a hot melt or dry coating can be laminated to a similarly coated surface or to another surface by means of heated rollers under slight pressure.

Figure 1. shows further subdivisions into which hot melts may be classed. Water vapor impermeability, fluidity, and softness are generally gained by the waxy type melts, but resistance to abrasion, grease, and oils; adhesion and low temperature flexibility are sacrificed. Table IV lists some of the advantages of hot melts over solution coatings.

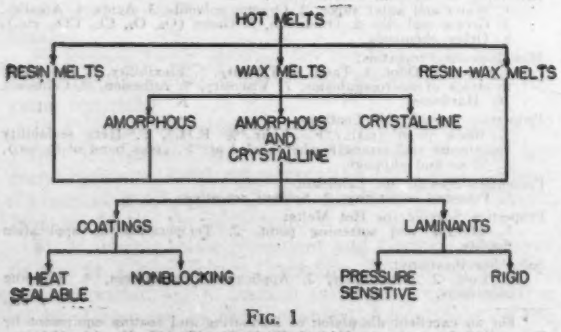


FIG. 1
Hot Melt Subdivisions

TABLE IV.—THE ADVANTAGES OF HOT MELTS OVER SOLUTION COATINGS

A. Absence of flammable and toxic solvents.
   1. Eliminates instaliation and operation of costly solvent recovery systems.
   2. Better working conditions.
   3. Rigid fire regulations may be lessened.
B. Elimination of active solvent effects on plastic films.
   1. Retained solvents cause softening, wrinkling, and shrinkage in many films.
C. Reduction of shipping weight and absence of limiting shipping regulations.
D. Use of nonbreakable and nonreturnable containers.
   1. Glass often used in shipping solutions.
   2. Drums must be purchased or returned.
   3. The government imposes strict regulations on the shipping of solvents.
   4. Paperboard and wooden cartons can be used for packaging most hot melts.
E. Does not necessitate continuous addition of thinners in glue pots and lacquer pans.
   1. Mixing requires time and labor when thinning is required.
F. Elimination of precipitation and settling encountered in some solvent systems on storage.
G. Rapid setting of melt.
   1. Delamination often results before the last traces of solvent permeate the film.
   2 Blocking may be caused by solvent retention.

Laminating Solutions

Pressure Sensitive Adhesives

This type of a laminant is applied from a solution to either one or both of the materials to be adhered and can be completely dried before combining. The lamination can then be accomplished by use of: 1. pressure, 2. heat, or 3. heat and pressure, depending upon the properties of the adhesive. This type of adhesive generally possesses good low temperature adhesion and flexibility, and if delamination should occur the surfaces can be recombined by simply pressing them together. Also it is usually possible to incorporate a larger amount of waxy materials into the composite, thus imparting better water vapor impermeability. On the other hand, cold flow is more apt to be encountered, resistance to delamination at higher temperatures is usually less and bond strength at room temperatures is decreased. Whereas, delamination of pressure sensitive adhesives may take place with extremely small loads when the pull is steady, a considerably larger load is often required to tear apart the bond when applied suddenly.

Solvent Active Adhesives

These adhesives rely upon the retention of just enough solvent to remain tacky so that lamination may be accomplished with a minimum of pressure. On aging, the solvent is dispersed through the surface plies, enabling them to adhere to a more rigid intermediate. Lamination of metal foils to nonporous materials would not be plausible by this method since solvent release would be extremely poor and it may require months of aging before the bonded material would show its true characteristics. Formulations of this type must necessarily possess better compatibility with the surface to which it is applied, as the final adherence can not be gained through tackiness as in the pressure sensitive laminants. There is then a certain correlation between compatibility and adhesion which can be seen by a study of Table V.

Fusion Type Adhesives

Bond strength here depends upon a welding or fusing of two or more materials together. This type of lamination gives a far better bond strength than the two previously mentioned types of laminating adhesives. The fusing action may be brought about through the medium of either the solvent, the plasticizer, or both. The sensitivity of this action can well be exemplified by the following problem: In heat sealing Pliofilm to itself, it has been found that the

air-dried surface heat seals more readily than the belt-dried surface. It can readily be determined which is the air-dried surface, by applying a drop of an active solvent, such as cyclohexanone, on the Pliofilm, folding it so that the two surfaces are separated only by a thin film of the liquid and then placing the material in an oven at 110°F. for 3 minutes. A fusion of the two surfaces takes place only when the fusing agent was applied between the air-dried surfaces of the Pliofilm. With higher temperatures, longer periods of heating or stronger fusing agents, fusion may occur on both surfaces.

Waxes, flaked metals, or any other nonfusible material may be included between laminated webs as long as a fusible resin is present in large enough proportions to establish a link for welding the two outer plastic webs together.

A typical fusion lamination, such as shown in Fig. 2, might be made between Pliofilm and chlorinated rubber. A nonfusible wax dispersed in the chlorinated rubber would, of course, weaken the bond. This type of lamination is very difficult to tear apart, its bond strength being nearly equal to that of the film itself. Fusion type laminations offer possibilities far beyond those obtained in the two previously mentioned methods; however, a detailed discussion is beyond the scope of this paper. The outline presented in Table VI shows some of the work which has been done.

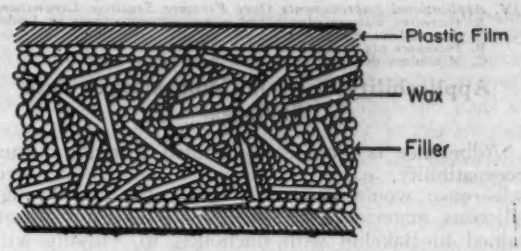


FIG. 2

TABLE VI—FUSION LAMINATIONS

I. *Lamination of Plastic Films:*
- A. Lamination of two or more plastic films of identical composition by use of a fusion agent.
  - 1. Without the incorporation of extra solids.
    - a. *Examples:*
      - 1. Rubber hydrochloride (pliofilm) to itself, using:
        - a. Active solvents, such as styrene, furfural, low molecular weight chlorinated hydrocarbons, cyclohexanone and other ketones, etc.
        - b. Active plasticizers, such as fenchone, certain Santicizers, and other higher molecular weight chlorinated plasticizers.
        - c. Active oils, such as No. 1-D heavy oil, Neville Oil, Notol, Nevinol, etc.
      - 2. Vinylidene chloride polymers (Saran) to itself, using ketone solvents.
      - 3. Vinyl films to themselves, using fusion solvents.
      - 4. Cellulose films to themselves, using fusion solvents.
  - 2. With the incorporation of resins, rubbers, metals, and/or waxes.
    - a. *Examples:*
      - 1. Isomerized rubber hydrochloride, cyclized rubber, chlorinated rubber, natural rubber, etc., plus fusion agent in solvent (active or nonactive).
      - 2. Natural or synthetic resins plus plasticizer, plus fusion agent, plus solvent.
      - 3. Flaked aluminum or other metals plus plastic filler, plus fusion agent, plus solvent.
      - 4. Crystalline or microcrystalline waxes.
        - a. With plastic filler, plasticizer, and solvent.
        - b. Without plastic filler.
      - 5. Combinations of resins, rubbers, metals, and waxes, plus fusion agent, plasticizer, and solvent.
- B. Lamination of two or more plastic films of varied compositions together by use of a fusion agent.
  - 1. Without the incorporation of extra solids:
    - a. By use of a common fusion agent.
      - 1. *Example:*
        Saran to pliofilm with cyclohexanone.
    - b. By use of mixed fusion agents.
      - 1. *Example:*
        Kraft paper to pliofilm with quaternary ammonium compounds and carbon tetrachloride.
  - 2. With incorporation of resins, rubbers, metals, and/or waxes.

II. *Lamination of Metal Foils:*
- A. Foils to plastic films.
  - 1. Fusion of solids to film and adhesion of solids to foil.
- B. Foils to themselves with plastic binder.
- C. Foils to other foils with plastic binder.

III. *Theory:*
- A. Film solvency:
  - 1. Dispersion of solvent into solid.
  - 2. Dispersion of solid into solid through means of a common solvent (fusion agent).
- B. Degree of fusion:
  - 1. Application of heat.
    - a. Effect on rate of fusion (increase).
    - b. Effect on evaporation rate of solvent and/or fusion agent (increase).
    - c. Effect on properties of film and filler.
  - 2. Time element.
  - 3. Type of fusion agent used.
  - 4. Type of film used.
- C. Relation of molecular structure to fusion.
- D. Inclusion of nonfusible particles in filler.

TABLE V.—RELATIONSHIP BETWEEN DIFFERENT RESIN TYPES AND SURFACES AND PROPERTIES IMPARTED BY RESINS

Composition	Type	Adhesion to: Plastic Films: Cellophane	Cellulose Acetate	Ethocel	Koroseal	Pliofilm	Polythene	Vinyl Films	Saran	Papers: Kraft	Sulphite	Glassine	Parchment	Rag	Misc.: Foils: Metal	Cloth	Glass	Wood	Properties: Sealability: Heat	Color	Resistance: Water	Grease and Oil Resistance	Flexibility	Odor	Stability	Sensitivity: Pressure
Vinyl acetate-pigment	Solvent-laminant	E	E	E	E		P	E	E	E	E	E		E	E		G	E	F	W	F	G	G	E	G	P
Butyral	Solvent-coating	E	E	E	P			P	E	E	E	E		E	G		F		E	T	G	G	G	E	E	N
Vinyl acetate	Solvent-coat.-lam.	E	E	E	F		P	E	E	E	E	G			G		P		G	T	G	G	G	E	E	C
Rubber	Solvent-laminant	E	G	E	P		P	G	E	E	E	E		E	E		O	G	N	T	G	P	E	G	G	E
Polyterpene	Solvent-laminant	G	G	G	G			E	G	E	E	E		E	E		E		P	T	G	P	G	G	G	N
Modified phenolic	Solvent-laminant	E	E	G	P		P	E	E	E	E	E		E	E	G	F	E	G	AT	F	G	E	G	F	G
Rubber-oil polymer	Solvent-laminant					E		E	E	G	E	E	G	E	G				N	A	E	F	G	G	G	E
Rubber-oil polymer-wax	Solvent-laminant					G		G	G	G	G	G	G	G	G				N	A	E	F	G	G	G	E
Rubber-oil polymer	Solvent-laminant	E	E		F	G	G	G	E	E	E	E	G	E	E		E		N	AT	E	G	F	F	F	E
Rubber-rosin-wax	Solvent-laminant	E	E	E	G	E		G	E	E	E	E	G	E	E		G		N	T	E	G	P	E	E	E
Rubber-rosin	Solvent-laminant	E	E	E		E			E	E	E	E	E	E	E				N	T	E	G	P	E	E	E
Vinyl copolymer	Solvent-laminant	E	E		E		F			E	E	E		E	E			F	N	T	E	G	E	E	F	E
Vinyl copolymer (modified)	Solvent-laminant	G	F	F	E		P	E		E	E	G			F		F	G	G	T	G	G	E	E	F	N
Vinyl copolymer (modified)	Solvent-coat.-lam.		P	P	G		P	E		E	E	F			E		E		G	T	G	G	E	E	E	N
Vinyl acetate	Solvent-coat.-lam.	E	E	F	P		P			E	E	F		E					G	T	G	G	E	E	E	N
Vinyl copolymer	Solvent-coat.-lam.	P	G	F	P			E	G	E	E	F					P	F	G	T	G	G	E	E	E	N
Vinyl acetal	Solvent-coat.-lam.		G	E	P		P			E	E				E		E		G	C	F	G	E	E	G	N
Rubber-wax	Solvent-laminant	G	G	G	F	G	G	G	G	G	E	G	G	G	G	G	G	E	P	P	E	G	G	E	E	E
Rubber-wax-asphalt	Hot melt coat.-lam.									E	E	G		E	E	E			G	A	E	P	G	G	G	N
Rubber-wax	Hot melt coat.-lam.	E								E	E	E		E	E	E	E	E	E	A	E	P	G	G	G	F
Polyamide	Hot melt coat.-lam.	E	G		P			P		E	E	E		E	E	E	P	E	E	AT	G	E	G	G	G	N
Vinyl acetate	Hot melt coat.-lam.									E	E	E		E	G		P	G	G	T	G	G	G	E	G	N

Key: E—Excellent. G—Good. F—Fair. P—Poor. N—None. T—Transparent. C—Cloudy. A—Amber. W—White.

IV. *Applicational Improvements Over Pressure Sensitive Laminations:*
A. Increases waterproofness and water vaporproofness in lamination without reducing adhesion.
B. Increases ply strength of films.
C. Minimizes delamination on low temperature flexing.

Applicability of Resin Composites to Base Surfaces

Adherence is most easily gained through mutual compatibility, e.g., in coating a porcelain object adherence would most likely be obtained through siliceous materials. Likewise, adhesion can be attained to Bakelite with phenolics, to Vinylite with vinyl polymers, to cellulose type films with homologous cellulose adhesives, or printing inks may be made to adhere to plastic films by incorporation of a resin, similar to the film composition in the ink base. Proper plasticization or the correct solvent scheme may also be important in the bonding together of similar materials.

Table V shows some relationships between different resin type formulations and various surfaces. From a study of this chart, the following relationships are noteworthy: 1. Papers give the best base surfaces for adhesion to all types of compositions, which is probably because of their fiber structure which offers the adherent something to grab on to in much the same way as climbing vines attach themselves to stucco or brick surfaces; 2. pressure sensitive type compositions are more generally applicable than rigid adhesives; 3. the compositions having the best flexibility are all pressure sensitive types; 4. the most difficult films to find adhesives for are the waxy types such as polythene; 5. addition of wax to formulations decreases their adhesive properties; 6. hot melts all show some degree of heat sealability and consequently, are susceptible to blocking.

In conclusion, the author should like to point out a few relationships which should prove helpful to both the formulator and the converter.

Water vapor impermeability may be attained by using waxy type adhesives and coatings, by laminating metal foils to the water sensitive surface or by using a wax-laminant in conjunction with such films as Saran or Polythene. Flexibility with a minimum of plasticizer is most prevalent in rubber type formulations. Grease- and oilproofness may be increased by using water- and alcohol-soluble composites in conjunction with such films as vinyl copolymers, methyl cellulose, polyvinyl alcohol, and polyamides.

The material covered in this paper was designed to present a general review of a largely diversified and expanded field. Specific methods for formulating along with experimental details were necessarily omitted. It is hoped the basic discussion of materials and specifications will prove helpful to the industries dependent upon the technical resources of the skilled formulator.

Development of V and W Board Weatherproof Corrugated Shipping Containers*

By W. B. Lincoln, Jr.[1]

Abstract

Weatherproof corrugated fiber containers were developed as a result of the war's acceleration of research in this field after many years of futile effort. Some of the various methods of approaching the problem are discussed, and the experimental work and successful methods described. Possible future developments and post-war uses are discussed briefly.

The Need

During World War I wood containers of various types were used almost exclusively. The fiber boxes of that day were inadequate for export use. In fact, they were not universally used for domestic shipments.

At the time of the outbreak of the current war, special overseas types of fiberboard had not been developed, although certain special domestic containers of high performance value were available. Many of these were strong enough for export use under peacetime conditions but were unsatisfactory for the rough handling, outside storage, and exposure to prolonged rain or high humidity encountered in wartime shipping.

The desperate need for enough containers in which to move the tremendous volume of Lend-Lease shipments and shipments of supplies to outlying bases which the Army was establishing at that time, made it absolutely essential that suitable grades of fiberboard be developed for overseas use.

During the period between World War I and World War II, many branches of American industry supplying essential materials and especially subsistence items to the armed forces, had been converted 100% to the use of the fiber box. It would have been impossible to have converted all of these plants to any other type of container. There was no other solution than the immediate development of suitable fiberboard for overseas use, board that would withstand the rigors of weather in any part of the world regardless of lack of suitable handling facilities, warehouses, or long-time exposure.

The earliest fiber boxes approved for overseas use were the so-called weatherproof solid fiber containers. These were a definite step forward compared with ordinary domestic types of boxes. This type of material was used during 1942. However, it became apparent in the late summer of that year that these containers were not of sufficient strength or weather resistance to perform satisfactorily in all of the war theaters. Technical developments which took place rapidly during the fall of 1942 enabled the industry to produce the

* Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 19-22, 1945.

[1] Member TAPPI; Development Engineer, Inland Container Corp., Indianapolis, Ind.

"V" box in several grades. Tests showed these boxes to be as much as fifteen times better than previous types.

The armed services approved the V box for overseas packing by the issuance of Quartermaster Corps tentative specification OQMG No. 93, dated 12-2-42, and similar specifications covering identical requirements, were issued more or less simultaneously by the Navy and other war agencies.

These developments had again accelerated the use of fiberboard to a point where it was obvious that the limited productive capacity of the solid fiber industry would be exceeded. Fortunately, during this same period developments had been taking place in the corrugated industry which enabled this branch of the industry, with almost unlimited capacity, to match the V type solid fiber with V type corrugated in all grades. Sharing the load the entire fiber box industry has been able to deliver V and W boxes at a rate as high as 45,000,000 boxes per month with greater production possible if needed and materials and labor were available. The corrugated industry is currently supplying approximately one-third of the total requirements.

The success of this development is distinctly another monument to the fortitude and ingenuity of the American manufacturer and his way of doing business. It was only through the cooperation of many interests representing the board, starch, resin, and box-making industries that this result was obtained. Only genuine foresight could have induced the pioneers to continue the terrifically expensive and time-consuming experimentation necessary in spite of lack of interest or encouragement on the part of the authorities.

The Problem

Requirements

The problem of developing a suitable corrugated fiberboard box was far more difficult to solve than the problem of producing a satisfactory solid fiber box. Because of the open cellular structure of the corrugated board, it is next to impossible to protect the adhesive from direct contact with water. Also the nature of the manufacturing process used in combining the liners and corrugating medium offers several serious mechanical obstacles to the use of just any adhesive which might be perfectly satisfactory to stick two flat sheets together.

Overseas containers for war must incorporate:

1. High resistance to water and high humidity requiring water resistant adhesives.
2. High performance values, especially puncture and retention, to resist rough handling.
3. Compression values, if obtainable, but generally the level of compression strength of fiberboard after prolonged exposure has been too low to seriously count on any grade of box stacking well without support from the contents.

Methods of Solution

The problem of developing a weatherproof corrugated container broadly divides itself into two different approaches with many sub-divisions:

1. Treatment of Domestic Board.—The first method is to treat by dipping, spraying, or otherwise coating or impregnating a finished container, either in a knocked down or setup condition, such container being made of orthodox domestic materials. This approach will not be discussed in detail since to date the degree of success has been very slight. Sufficient to say, quite a few compounds, waxes, asphalts, lacquers, paints, etc., can be applied to domestic boxes to make them fairly water resistant to a light spray if no rough handling precedes subjection to exposure to water. It is obvious, however, that the level of performance of such domestic boxes is low to start with, and surface treatment will not add materially, if at all, to that level of performance. The method in the present state of the art is at best little more than a makeshift answer which will inhibit deterioration but will not stop it. Any serious scuffing, tears, or puncturing of the container destroys the waterproof barrier and permits entry of water which will, by wick action, be spread throughout the container resulting in its early failure, especially destruction of adhesive bonds. In general, it is believed that surface treatment of domestic types of boxes is a rather dangerous approach to the problem of providing suitable containers for overseas shipment. Inexperienced and unqualified personnel may gain the mistaken idea that such procedures are entirely effective and be led into the mistake of using them indiscriminately. Such containers are not of adequate strength to retain the continuity of walls or score lines, therefore, the surface treatment cannot be totally effective and should only be used as a last resort when really suitable grades of board are impossible to obtain. It is seldom that well managed procurement procedures can not secure proper boxes on suitable priority.

2. Building a New Board.—The second approach to solving the problem of weatherproof corrugated construction is to build a box complete from special weatherproof components, incorporating the necessary water resistance and strength values to satisfactorily perform in service. This approach was the one followed in a development of the board which later became recognized as the V-3c grade, and led to the development sometime later of the W-5c and W-6c grades. This approach had four basic components to deal with:

a. Adhesive.—This component had to have the following characteristics:
   1. Complete water resistance.
   2. Not subject to break down through mold growth or other deterioration under tropic conditions.
   3. Relatively low in cost.
   4. Adaptable to use on corrugators.
   5. Permit reasonable manufacturing speed.
   6. Mixing technique relatively simple and not too technical.
   7. Develop water resistance with a relatively short curing period and no special drying or heating beyond that normal to corrugator operation.
   8. Not involve the use of solvents of inflammable or explosive nature.
   9. Preferably set by heat.

b. Corrugating member.—This component had to have the following characteristics:
   1. High wet strength, including rigidity, tear, and puncture resistance.
   2. Compatible with water resistant adhesives used and permit a satisfactory bond to be made under corrugating conditions and speeds, in spite of its heavy sizing.
   3. Perform properly on the corrugator at reasonable operating speeds.

c. Liners.—These components had to have the following characteristics:

1. High wet strength, including rigidity, tear, and puncture resistance.
2. Compatible with water resistant adhesives used and permit a satisfactory bond to be made under corrugating conditions and speeds, in spite of its heavy sizing.
3. High resistance to scuffing, either dry or wet.

d. Fabrication.—Final but definitely not the least important component, "good fabrication," which counts for much of a fiber box's strength. Methods of fabrication had to be developed suited to the character of the other components and efficient as to productive rate and finished container values.

The Solution

Early Efforts

Many attempts have been made through the years to develop a water resistant corrugated board for use in domestic service under high humidity or moist conditions. This work has followed several lines of endeavor, many probably never publicized, but some of those that are known included methods such as:

1. Treating the combined board with an asphalt emulsion poured through the flutes.
2. Using asphalt or asphalt base mixtures as a waterproof adhesive.
3. Using asphalt impregnated corrugating sheets and liners.
4. Using asphalt laminated corrugating sheets.
5. Using asphalt laminated liners.
6. Using rubber base adhesives.
7. Using paraffin or other wax coatings.
8. Using lacquer or other surface coatings.
9. Using liners to which parchment or foil has been laminated, etc.

While imparting a degree of water resistance, none of these methods resulted in enough improvement to enable containers to meet wartime requirements. In the majority of cases the method proved too costly to be commercially practical for wide application at the time the work was being done and many experimental programs were dropped for that reason.

It might be of interest to many who have not been close to the program to know how the weatherproof corrugated container came into being. Like so many developments, it originated as an idea which involved but a few people. The finished result, however, was only a success after a long period of intensive cooperation on the part of the adhesive manufacturers, the Southern kraft board mills, and the box-makers. Only through the consolidation of the knowledge and ideas of all of these interests, was success attained.

Intensive development started early in 1941 when it was felt that there was a definite need for weatherproof corrugated board for export packing of Lend-Lease shipments to England. An intensive research program was inaugurated to develop a weatherproof corrugated container, stressing the second approach, namely the fabrication of a box from special components throughout. Experience had shown that ordinary commercial starch paste had a considerable resistance to high relative humidity. In the early experiments this adhesive was used in conjunction with special liners in several tests. Most promising results finally culminated in production of boxes made with special dense, highly sized liners, using sized 0.009 and 0.014 liners as corrugating material. The Federal Surplus Commodities Corporation was interested in this development and with their cooperation this board was tested at Forest Products Laboratory in February, 1942. Results were quite favorable and indicated real progress as compared with the zero performance of ordinary domestic grades of board subjected to submersion in water.

During the course of these experiments a urea formaldehyde resin type glue, apparently being used by the laboratory in certain of its experiments with wood, was used to provide a waterproof seal of the flaps so that they would not open during spray and submersion tests. The marked superiority of this glue and resistance to water during the tests led to discussions with the adhesive company's technicians which soon resulted in the successful development and application of ways and means of incorporating urea formaldehyde resins in starch paste, suitable for use in the corrugating operation. Results of the tests at Forest Products Laboratory were quite favorable. Knowing that the specification for such boxes would be acceptable only if the boxes were generally available from a large portion of the box industry, a meeting was arranged on April 3, 1942, at the Indianapolis plant of the Inland Container Corporation which was attended by various manufacturers of linerboard, adhesives, solid fiber and corrugated shipping containers. At this meeting the results of the Forest Products Laboratory work was discussed and additional laboratory tests were witnessed.

While admitting some progress had been made, the general feeling was that it was far from a success and in fact, that it was impossible to develop a weatherproof corrugated box having performance values sufficiently high to be of interest. The development work proceeded, however, and further contributions in the way of improved board components and further perfection of the urea resin starch adhesive and fabrication methods finally resulted in the production of boxes which, when tested by an independent laboratory, matched the performance of the then currently approved weatherproof solid fiber boxes in every way except bursting strength tests.

In setting up the laboratory program the problem was analyzed by outlining the hazards to be anticipated in export shipping. These hazards were then translated into laboratory equivalents. The boxes were subjected to rough handling considerably in excess of that to be anticipated in domestic shipments in an effort to simulate hazards encountered prior to delivery to ship's side. The various lots of boxes were then subjected to one of the following exposure conditions: 24-hour or 7-day submersion under water, 14 days of high humidity or 24 hours submersion with redrying to normal moisture content. After exposure to these various types of severe water hazards, these boxes were subjected to further rough handling until complete failure occurred. The results of the tests proved conclusively that corrugated could be made to match the performance of boxes meeting current specification requirements.

About this time, however, information concerning the unsatisfactory performance of fiberboard boxes in overseas shipments was brought to Washington by high ranking officers and it was decided that all performance values should be increased. As a result the armed services and WPB were hesitant to approve this newly developed and untried material. In fact, about this time orders were issued to discontinue the use of all fiber boxes for overseas shipments. It was soon found impossible to do this, however, and these restrictions were withdrawn. The need for further improvement of fiber boxes for this use was quite apparent, however, and development continued.

Some months later, as the increasing demand for shipping containers made it apparent that the solid fiber industry would be unable to supply all requirements, the grade of material later known as V-3c was approved and put into use for the packing of rolls of compressed toilet paper and stationery items, such as letterheads, mimeograph paper, and the like. The corrugated board which was finally approved for this use and later became known as V-3c, was essentially the same as tested earlier in the year, although the bursting strength was stepped up through the use of still heavier liners and corrugating material than had previously been developed.

FINAL EFFORTS

Adhesives.—The successful development of a weatherproof corrugated fiber box was dependent upon the availability of a truly water resistant adhesive having suitable characteristics as to cost and operating performance on machines to permit the fabrication of double faced corrugated board. Real success in the solution of this problem finally came from the development of the acid type starch fortified with water soluble urea formaldehyde resin which contributed the necessary water resistance. The use of adhesives of this type has been rather thoroughly publicized during the last couple of years, but it might be well at this time to point out certain facts in connection with their use for the production of weatherproof corrugated board.

The use of this type of adhesive on a corrugating machine is a much more complex problem than its use in the production of solid fiber. The necessity of forming the flutes at the rate of over 125 per second on rolls heated to over 300°, and the need for extremely rapid setting so that the flute structure will not be lost, are typical of the kind of problems that had to be solved. The presence of so much heat held the constant threat of causing the adhesive to set in the glue pan, not only stopping the operation and spoiling the paste but presenting a very difficult cleaning job. In the beginning it was anticipated that the glue pans would have to be equipped with refrigerating coils and that rather elaborate control equipment would have to be provided to prevent polymerization of the adhesive before it was applied to the board. It was also feared that glue life would be extremely short under the hot operating conditions that exist in a typical corrugating plant and that batches would have to be mixed frequently and kept cold.

All of these problems, however, were solved and proved eventually to be capable of control with less trouble than had been anticipated. The adhesive has proved eminently successful and quite practical to run in day-in and day-out operation.

Corrugating material.—The early experiments in which a sized liner was used as a corrugating member indicated the desirability of working in this general direction on this component. Continued experiments resulted in a special, heavily sized, dense corrugating sheet of 100% sulphate kraft fiber. To secure satisfactory performance it was necessary to use approximately 50% more material than normal. In order to maintain a caliper which would permit the sheet to be fabricated on existing corrugating equipment as well as to provide a high density, water resistant sheet, it was necessary to increase the density approximately a third to secure the desired result.

Liners.—Heavily sized, dense, highly water resistant liners were used early in the course of the program. For the reasons previously mentioned the trend of thinking during all this period of development was for better boxes of higher test, therefore, the weight and density of the liners finally adopted were considerably higher than in the case of liners used in the initial tests. It was found that these liners had to have certain definite characteristics to assure success, e.g., to properly cure or set the resin in the urea resin starch adhesives, it is necessary that a low pH be developed in the glue line and it is important that the board used be free of alkali in the fibers which might bleed out into the glue and neutralize the effect of the acid catalyst. Board must be dense and well sized so that the glue will not soak into the board leaving a starved glue line. For successful results with this type of waterproof adhesive the resin manufacturers state that the following requisites must be met by the board:

1. It must be made from well-washed pulp.
2. It must be highly sized with rosin and alum, and must contain sufficient free alum to neutralize any eventual bleed of alkali in the fibers.
3. It must be a dense, well hydrated board, highly calendered preferably water finished on both sides. In order to meet the conditions of service, it is also necessary that liners possess high bursting strength, high tear resistance, and high scuff resistance, both when dry and wet.

While some claims have been made that the waterproof adhesive increases the water resistance of the board, its primary function is to provide a water resistant bond which is stronger after soaking than the component parts it joins. In general, the use of this adhesive in the attempt to make up for insufficient sizing has not been too successful. Water resistance of the board must be provided for by proper papermaking at the time the liners and corrugating member are made.

Another development in the liner field was the sisal-kraft sheet. This is an asphalt duplexed sheet reinforced with sisal fibers imbedded in the asphalt matrix joining the two paper components. This material had been awaiting the demand for its exceptional high strength values to develop.

While the use of this type of liner has been greatly restricted due to lack of sisal fiber, specifications provide for corrugated boxes made with this type of facing in both the V-1 and V-2 grade.

Progress and Application.—As mentioned before, the first application of the weatherproof corrugated box by the armed services was made in the fall of 1942 at which time a number of paper and stationery supply items required by the Quartermaster Corps in very large volume were specified packed in either corrugated or solid fiber of 400 pound dry test, 150 pound wet test, after 24 hours submersion, and with ¼ inch ply separation permitted after 24 hours submersion.

A few weeks later, or about the middle of November, the testing program being supervised by the writer for the Quartermaster Corps, was completed, and based on the results obtained specification OQMG No. 93 was prepared and issued as of December 2, 1942. This specification provided for a V-1$^{r}_{e}$ reinforced double wall corrugated grade of board, having a 750 pound dry test and 500 pound wet test after 24 hours immersion. Also a V-2$^{r}_{e}$ single wall, corrugated container with reinforced outer liner, having a 400 pound dry test and 250 pound wet test after 24 hours immersion, and finally, the V-3c testing 400

pound dry and 150 pound wet after 24 hours immersion.

From this time on many suitable applications for corrugated V boxes were found and the volume of production as well as the number of available sources of supply multiplied at a rapid rate. One of the early developments was the application of the V-3c to the packing of beer in glass bottles for overseas shipment. This application necessitated the development of a lighter weight board for use as inner packing. Simple as it seems, this presented several rather important problems. The corrugated industry was just getting started with V board and there were many companies that were skeptical as to the possible volume requirements and the general desirability of attempting to run this type of board which admittedly involved many technical problems at that stage in its development. Realizing that it would be very difficult to induce all manufacturers to secure and have available a special grade of liner just for this purpose during this rather trying development period, it was decided that a sheet of combined board might be developed using the 0.010 inch corrugating material for the two facings, as well as the corrugating member. An experimental run of board of this combination was immediately made and proved to have the necessary characteristics to handle the job. This type of board was written into the beer specifications and served for nearly a year with no further identification.

As time went on, it became apparent that many inner packing boxes currently being made of domestic board were either proving not satisfactory or involved the expensive operation of wrapping with waterproof paper. Also some of the heavy grades such as the V-3c or V-2 were at times being used for extremely light weights thereby wasting critical material. It was obviously desirable to have generally available, and covered by specifications, one or two grades of material lighter than the V-3. It was decided that the sheet made with three 0.010 corrugating sheets, previously mentioned, would prove satisfactory for the lowest test combination, and this was adopted and given the designation W-6c.

It was further decided that one intermediate grade would suffice and tentative standards of 275 pound dry and 100 pound wet were established as desirable characteristics. An experimental run showed that this objective could be met with a 0.016 weatherproof type of liner combined with the standard 0.010 weatherproof corrugations. This sheet proved quite acceptable and was designated W-5c. The numbers of these two additional grades, fitted into the original pattern of grade numbers assigned to the V boxes. (Grade 4 was originally assigned to a high test domestic type of board. To avoid confusion, this number was skipped in the V and W series.)

It might be mentioned at this point that in all their characteristics, the W boxes are identical to V boxes. They are simply lower test grades of the same family. The Quartermaster depots had been instructed to consider the V compliance symbols as indicating an acceptable overseas shipping container, W boxes were in general of too light construction to be used as exterior containers during wartime shipping conditions. It was, therefore, felt desirable to use the code letter "W" on these lighter grades so they would not be used as exterior containers, except when specifically authorized.

The first application of the W-5c board was a special authorization of this kind which permitted its use as an exterior packing box for either bottled or canned beer for overseas shipment. The W-3c pack using sawdust as extra cushioning material, had been so satisfactory for bottled beer and the record of breakage so extremely low that this seemed a desirable move especially in view of the fact that a very large tonnage of critical kraft pulp was saved by the change.

These two new grades of board were first described in Quartermaster Corps packing specifications for bottled and canned beer and were later incorporated in joint Army-Navy specification, JAN-P-108. They are currently being widely used for packing of many small parts, especially items which are assembled in larger packing cases for shipment abroad, but which will be delivered to the actual fighting front in the W box as an outer container for the final short handling from the base depot to the front.

It is hard to predict at this point just what future developments will take place in the weatherproof corrugated field. Undoubtedly in the post-war period the industry will have available materials which are possibly on the secret list currently or certain materials which are greatly restricted as to their use either because of cost or shortages in the supply. Through the wider applications of wet strength resins and the like, and possibly certain surface treatments in combination with improved basic materials, considerable improvement in performance values and possibly even characteristics not incorporated in boards of current production may be anticipated. Competitive pressure to reduce costs will make it necessary for all of these boards to be manufactured at a minimum cost, and it is hoped that some of the more expensive components, particularly of the adhesives, will be available at lower prices after the war.

Some work has been done with laminated liners and corrugating material, which may find further development in the post-war period. Rapid developments in the resin field may lead to new and improved adhesives capable of higher operating speeds and new sizing materials which may likewise improve operation in the paper mills.

Some success has been attained in the application of newly developed types of adhesives having a polyvinyl alcohol base and further development along this line may be a possibility. All in all, it is the author's opinion that we can definitely hope for material improvement and widening of the field of application of this type of board.

Post-War Development

The availability of the V board type container opens up possibilities in numerous fields heretofore too difficult for the commercial fiberboard box to handle. Most of these applications involve contact with moisture or long storage exposed to high humidity. Typical examples are packing of articles for export, of articles which are subject to cold storage, such as eggs, fruits, vegetables, fresh or frozen meat or poultry, and retrip beverage containers, or other containers which are likely to be exposed to inclement weather during transportation.

Many of these fields have been investigated and numerous designs are available which have been awaiting development of a board having the proper characteristics to enable it to withstand the effect of moisture. It is the author's belief that the V and W type boxes will go a long way toward solving many of these problems as well as opening up additional opportunities for application in fields heretofore restricted to older types of containers.

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New York Paper and Pulp Market Review

Market More Optimistic of Larger Civilian Paper Supply In Third Quarter — Prospect of Early Shipment of Swedish Pulp Good — Demand For Waste Paper Heavy — New and Old Rags Active.

Office of the PAPER TRADE JOURNAL,
Wednesday, July 3, 1945.

Paper and paperboard of many types are so essential in the conduct of the war and for indispensible civilian activities that the paper supply situation continues critical, despite the latest reported production ratio of 90.4%. Containerboard is in the tightest supply with no prospect of any easement in the near future. The general paper supply situation, however, is slowly improving. Prospects still appear favorable for a somewhat better civilian supply in the latter part of the third quarter. A relatively tight market is generally expected to continue until the war with Japan is more definitely defined as to its termination. Reports from many manufacturers' representatives, jobbers, and general paper merchants this week, reflect more optimism and the expectation that the whole supply situation is slowly improving.

Paper production for the week ended June 23 was estimated at 90.4%, compared with 90.8% for 1944, with 87.0% for 1943, with 84.5% for 1942, and with 101.5% for the corresponding week in 1941.

Paperboard production for the week ended June 23 was 93.0%, compared with 96.0% for 1944, with 96.05 for 1943, with 72.0% for 1942, and with 90.0% for the corresponding week in 1941.

The Requirements Committee of the WPB has authorized approximately 108,000 tons of kraft paper for shipping sacks in the third quarter, and hopes increased output by some mills will furnish a total of 119,000 tons of kraft paper and 17,000 additional tons of asphalt laminated paper.

Pulpwood

Pulpwood receipts in May of 1,461,000 cords, were 13% above May, 1944. Five months receipts were, however, 2% less than in the same period in 1944. Domestic pulpwood receipts for May aggregated 1,311,600 cords, which is 7% above last year and 17% above April, 1945.

Wood Pulp

WPB reports wood pulp control order M-93 could be dropped if Swedish pulp imports meet expectations in the third quarter. The possible revocation of this order depends also upon the maintenance and intensification of the present 575,000 ton monthly collection rate of waste paper.

Rags

Mill buying of cotton cuttings continue active, with buyers freely taking substitute grades. Prices are firm at ceiling levels. More reports are currently received indicating supplies of new cotton cuttings are below mill demands.

Trading in old cotton rags continues active. All grades are in rather heavy demand this week. The roofing grades continues steady, with felt mills buying actively. Demand for old whites and blues continues good. Prices are firm and unchanged.

Old Rope and Bagging

No change of importance has been reported this week in the old rope market. Mill demand for Manila rope continues active. Other fibers are reported in good demand this week. Prices are unchanged.

No important change in trading activity or supplies has been reported in the bagging market at this date. Demand for No. 1 gunny and No. 1 bagging is moderate to good. Buying is on a limited scale, however, and the volume reported at this date is relatively light. Supplies are still reported as very light. Prices are unchanged.

Old Waste Paper

Collections of waste paper has thus far held up fairly well. Less supplies are expected, however, in the remaining summer months, which are normally slow. Collections have never met the quotas set and as the current collections are slowing down, it seems doubtful if the average volume of 575,000 tons months can be realized.

The paper stock market continues firm with prices strong at ceiling levels.

Twine

No important change in supplies or prices has been reported in the twine market this week. Demand continues seasonally good.

Gould to Concentrate on Specialties

LYONS FALLS, N. Y., July 2, 1945—The Gould Paper company, of which R. W. Shaver is the president and general manager, will go out of production of newsprint at the end of this month after 51 years of producing this grade of paper, it was announced at the company offices here today. The company plans to change grades and re-adapt its processes to more profitable groundwood specialties. These will be of a considerable variety and will be produced in about the same tonnage as the present newsprint capacity of the mill, which is 100 tons every 24 hours. Approximately the same size working force will also be required, which is 200 hands for the mill and 400 men in the woods operations in the Moose river and Tug Hill tracts.

Under the new arrangement the company will supply its products mostly under government contracts for war uses, supplying army and navy and government printing office services.

While the company is not making a definite statement concerning its new products they will include a corrugated container for mazda lamps used in army and navy services, and there will be corrugated containers essential for cartons used in the war effort.

The Gould company was one of the few remaining newsprint companies in New York state, once one of the leading states in the manufacture of this grade of paper.

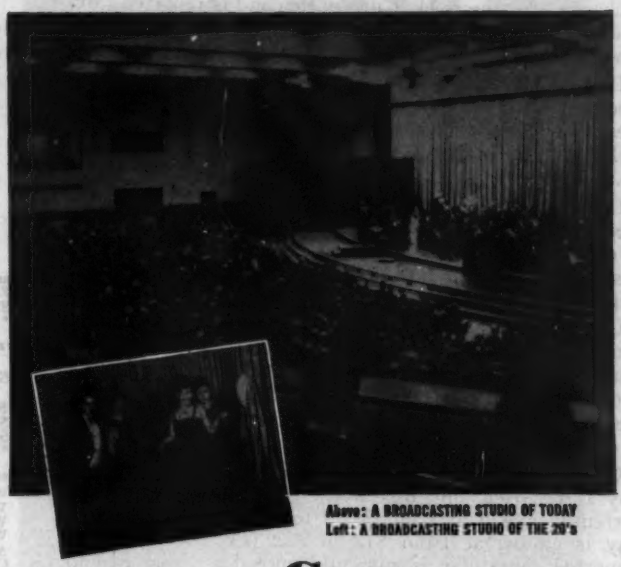
Echoes of a Quarter Century

During the years from 1920 to 1945 radio has grown from an infant to a huge industry serving and influencing the lives of millions, and is now reaching into new fields through television and radar.

A similar growth has occurred in the chemical industry in America during these years. Founded in 1920, Witco has grown steadily with this industry, playing an increasingly important role in the development of new and finer chemicals and better processing methods for the manufacture of various products. And during the war Witco's experience has been greatly enhanced by the development and adaptation of special materials to war demands. Particularly valuable are the company's contributions in the fields of rubber, sealing compounds, surface coatings, printing inks and asphalt products.

If you use carbon black or other pigments, asphalt specialties, colors, fillers or chemicals, Witco can meet your needs and help you apply these materials efficiently. Our research laboratories are at your service.

WITCO CARBON BLACK No 11... A cleaner, dustless black that disperses more readily and evenly to impart a deep, rich tone to your black papers. More economical because it may be added directly to the beater without removal from the bag.



Above: A BROADCASTING STUDIO OF TODAY
Left: A BROADCASTING STUDIO OF THE 20's

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, July 5, 1945.

BLANC FIXE—The market for blanc fixe is reported unchanged for the week. Current demand is reported fair. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton.

BLEACHING POWDER — Current demand is reported active. Supply situation reported satisfactory. Bleaching powder is currently quoted at from $2.50 to $3.10 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point.

CAUSTIC SODA—Supply situation continues tight, with production good and very heavy all-over demand. Manpower limits output. Solid caustic soda is currently quoted at $2.30 per 100 pounds. The flake and ground are currently quoted at $2.70 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CHINA CLAY—Demand for some grades of china clay is reported fair this week. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Production reported maintained at high level. Paper allocated 47,705 tons in second quarter. Prices remain unchanged. Chlorine is quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b. works.

ROSIN—No offerings or sales at unchanged OPA ceiling prices: "G" gum rosin at $5.79 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $5.75 per 100 pounds in barrels, New York. Seventy per cent gum rosin is offered at $6.06 per 100 pounds, f.o.b. works.

SALT CAKE—Demand reported moderate. Quotations on salt cake continue to remain unchanged. Domestic salt cake is currently quoted at $15 per ton; chrome cake at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH — Market requirements for soda ash continue heavy. Supply adequate. Bulk deliveries improved. Bagged lots still slow. Prices unchanged. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Market supply of cash corn reported lighter this week. Corn prices firm at ceilings. Starch quotations continue unchanged. Pearl is currently quoted at $3.72 per 100 pounds. The powdered grads is currently quoted at $3.83 per 100 pounds. All prices f.o.b. Chicago.

SULPHATE OF ALUMINA — Supply situation reported good. Quotations are unchanged. Prices on the commercial grades are quoted at from $1.15 to $1.25 per 100 pounds. The iron free is currently quoted at $1.85 per 100 pounds. All prices in car lots, in bags, f.o.b. works.

SULPHUR—Demand is reported active for sulphur. Quotations on all grades continue unchanged. Annual contracts are currently quoted at $16 per long ton, f.o.b. mines. The current contract prices at Gulf Ports remains unchanged at $17.50 per long ton.

TALC—The demand for domestic talc is reported heavy this week. Quotations unchanged. Domestic grades are quoted at from $16 to $21 per ton, at mines. Canadian $24 per ton. All prices in car lots.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—			
Roll, contract	*$61.00	@	—
Sheets	69.00	@	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, Delivered			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.35	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*50.00	@	—
Chip	*50.00	"	—
Sgl. Mla. L1. Chip	*62.00	"	—
White Pat. Coated	*75.00	"	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds		Ledgers	
100% Rag Ext. No. 1	$39.10	@ $46.00	$40.25	@ $47.25
100% Rag	32.20 "	37.75	33.35 "	39.25
85% Rag	.... "	....	29.90 "	35.00
75% Rag	23.00 "	27.00	24.15 "	28.25
65% Rag	.... "	....	22.80 "	27.75
50% Rag	18.70 "	22.75	19.90 "	24.25
25% Rag	16.40 "	20.00	17.55 "	21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:

	Bonds		Ledgers	
No. 1	$10.55	@ $12.75	$11.70	@ $14.25
No. 2	9.65 "	11.75	10.80 "	13.25
No. 3	9.20 "	11.25	10.35 "	12.50
No. 4	8.90 "	10.75	10.05 "	12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:

No. 1 Glossy Coated	$13.65	@ $15.3
No. 2 Glossy Coated	12.40 "	14.0
No. 3 Glossy Coated	11.60 "	13.2
No. 4 Glossy Coated	11.15 "	12.7
No. 1 Antique (watermarked)	10.25 "	11.7
No. 2 Offset	9.60 "	11.0
A Grade E. F.	9.35 "	10.7
A Grade S. & S. C.	9.60 "	11.0
B Grade E. F.	8.85 "	10.2
B Grade S. C.	9.10 "	10.5
C Grade E. F.	8.55 "	9.7
C Grade S. C.	8.80 "	10.0
D Grade E. F.	8.25 "	9.5
D Grade S. & S. C.	8.50 "	9.7

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00 @ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	76.00
Unbl. Soda	72.00
Groundwood	50.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

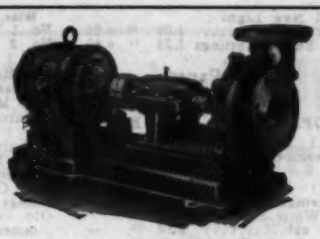
New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

*OPA Maximum Prices

WHAT DO YOU PUMP...



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No matter what your pumping problems are, a Frederick Pump is *guaranteed* to take care of them to your complete satisfaction.

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Frederick engineers will build a pump . . . from our basic design . . . which will do the specific job you have for it to perform in your plant.

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Frederick, Maryland

STOKER SPECIALISTS SINCE 1918

SOLVAY*

. . . KEYED TO TODAY AND TOMORROW

ROCKET MAIL—Farfetched? So was the airplane. The rockets of tomorrow will carry mail air express, New York to London and other world centers.

Today . . . Solvay Alkalies are a vital, basic factor in the construction of war materiel. Caustic Soda, Soda Ash and many other related products are now being supplied from three strategically located plants. Established in 1881, Solvay is America's largest source of quality alkalies.

Tomorrow . . . Solvay products will contribute immeasurably to the advancement of all American industry. With extensive resources, facilities, and experience, Solvay will continue to manufacture the finest alkalies, and will serve industry with comprehensive information and technical service.

SOLVAY

* The Solvay Process Company employs salt, limestone and ammonia to make Soda Ash, from which basic material Caustic Soda and other alkalies are derived

SODA ASH
AMMONIUM BICARBONATE
AMMONIUM CHLORIDE
PARA-DICHLOROBENZENE
CAUSTIC POTASH • CHLORINE • MODIFIED SODAS

CAUSTIC SODA
POTASSIUM CARBONATE
SODIUM NITRITE • SALT
CALCIUM CHLORIDE

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 RECTOR STREET NEW YORK 6, N. Y.

THE PROBLEM OF THE

UNSALABLE PAPER

A mill making paper for Radio Condensers found that every time they changed felts, much of the first day's production was lost. WHY—because the new felts were shedding wool fibers into the sheet. To be salable, paper for radio condensers and other electrical applications must be perfect.

Orr Felt was called in and, as they have for so many mills, they designed a new, special felt, that practically eliminates fiber shedding and produces salable paper almost from the very start.

One of Orr's special felts may be what you are looking for. Consult our representative — soon.

THE ORR FELT & BLANKET CO., PIQUA, OHIO

ORR FELTS

Old Rags

White, No. 1—			
Repacked	*1.80	¢	—
Miscellaneous	*1.20	¢	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Third and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.80	"	—
Roofing Rags—			
No. 1	*1.35	¢	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

*OPA Maximum Prices.

Foreign Rags

Pre-War Quotations

All Prices nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.25	@	3.30
Wool Tares, light	3.25	"	3.50
Wool Tares, heavy	3.50	"	3.75
Bright Bagging	3.25	"	3.50
Manila Rope—			
Foreign	—	¢	—
Domestic	*5.75	"	—
Jute Threads	5.50	¢	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	2.00	"	—

*OPA Maximum Price.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	¢	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Mixed Books	1.10	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Mixed Ledger, colored	2.00	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.95	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	¢	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.35	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	¢	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
Old Corrugated Containers	.82½	"	—
Mill Wrappers	1.10	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17½	"	—
Paper Makers	.17	¢	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.21	¢	—
Soft Fiber Rope	.19	"	—
Cotton	.21	¢	—

(Hard Fiber)

Medium Java	.18	¢	—
Mex. Sisal	.16	"	—
Manila	—	¢	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill.)

Shirt Cuttings—	
New White No. 1	.07¼
New White No. 2	.05¼
Light Silesias	.05¼
Black Silesias, soft	.03¼
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable shredding	.01¼
Fancy Percales	.04¼
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04¼
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1 — Repacked	3.80	¢	—
Miscellaneous No. 1	3.30	"	—
Miscellaneous No. 2	2.45	¢	—
White No. 2 — Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	¢	—
Repacked	2.30	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	¢	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	¢	—
Old Manila Rope	5.75	¢	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	¢	3.10
No. 1 Clean bright—			
Sisal Strings			.04
No. 2 Clean bright—			
Sisal Strings			.03
Sisal Jute	.02½	"	.02½
Scrap—			
No. 1	2.25	¢	2.30
No. 2	1.75	"	1.80
Wool Tares heavy	4.00	¢	4.21
No. 1 New Lagos Burlap	4.00	¢	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	¢	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	¢	—
White Blank News	1.65	¢	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Hard White Shavings, ruled	2.50	¢	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	¢	—
Mixed Colored Shavings	.75	¢	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	¢	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	@	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	* —	"	4.00
Mixed Rope	—	"	1.55
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Car Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3	"	3.25
South American	—	"	3.25

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	¢	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	¢	—
Mixed Colored Shavings	.75	¢	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	¢	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	@	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	* —	"	4.00
Mixed Rope	—	"	1.55
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Car Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3	"	3.25
South American	—	"	3.25
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	
Aust. Wool Pouches	—	"	3.65
New Zealand Wool Pouches	—	"	3.50
New Burlap Cuttings	4.75	¢	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	¢	1.00
No. 2 Roofing Bagging	1.35	"	—

*OPA Maximum Price.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04½
Fancy Percales	.04¼	"	.05
New White No 1.	.06¼	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06½
Underwear Cutters, Bleached	.06¼	"	.06½
Underwear Cutters, Unbleached	.05¼	"	.06
Silesias No. 1	.06	"	.06½
New Black Silesias	.03	"	.03½
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06½
Blue Cheviots	.05½	"	.06
Fancy	.02¼	"	—
Washable	.02¼	"	—
Khaki Cuttings	.02¼	"	.03
O. D. Khaki	.03½	"	.03½
Corduroy	.03½	"	.03½
New Canvas	.06¼	"	.06½
U. V. D. Cuttings	.06¼	"	.06½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	¢	—
Twos and Blues, Repacked	2.20	¢	—
Old Blue Overalls	2.25	"	2.00
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	¢	—
Black Stockings	3.50	¢	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	¢	—
Quality C	.95	"	—
Old Manila Rope	5.75	¢	—

*OPA Maximum Prices.

Foreign Rags

(F. o. b Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	¢	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	¢	—
No. 1 White Ledger	2.30	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	¢	—
No. 1 Assorted Old Kraft	1.75	¢	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
No. 1 Roofing Rags	1.35	¢	—
No. 1 Roofing Bags	1.45	¢	—

West Virginia Pulp and Paper Company

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503 Market St. San Francisco, Cal.

Manufacturers of

ENGLISH FINISH SUPERCALENDERED
MACHINE FINISHED BOOK
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HIGH GRADE COATED BOOK

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KRAFT WRAPPING AND KRAFT ENVELOPE
KRAFT LINER BOARD
BLEACHED SULPHITE AND SODA PULP
BLEACHED AND UNBLEACHED KRAFT PULP

MILLS:
Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

CLAFLIN REFINER

CONTINUOUS BEATING: Three No. 2 Claflins in series. Furnish of Southern Bleached Kraft — 50 tons/day. Pulping operation—through three Claflins—to beaters used only for mixing—to Jordans for final cutting control to paper machine. Total of 540 h.p. on Claflins. Freeness drop from 685 c.c. to 310 c.c.

BATCH BEATING: No. 2 Claflin — Furnish of Southern Bleached Kraft—2,000# batch. Stock pumped from chest into Claflin to another chest. At end of 15 minutes and two passes, Freeness 548, a drop of 72 c.c. At end of 30 minutes, after 4 passes, Freeness 476, drop of 144 c.c. At end of 45 minutes and 6 passes, Freeness 400, drop of 220 c.c. Mullen 72%—548 c.c., 102%—476 c.c. and 145%—400 c.c.

Adaptable also for brushing out fibre bundles and lumps with minimum degree of cutting and reduction of Freeness. (Tissues).

LARGER CAPACITY NO. 3 SOON AVAILABLE

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LANCASTER, OHIO

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Mine: Newgulf, Texas

Wallpaper Production Waits on Pigment

WASHINGTON, D. C., July 3, 1945—Increased availability of base paper stock for wallpaper manufacture during the third quarter of 1945 may permit a slight relaxation in provisions of War Production Board Order L-177, which controls manufacture and distribution of wallpaper, members of the Wallpaper Industry Advisory Committee were told at their recent meeting, WPB reported today.

Tightness of supplies of color pigments for wallpaper, however, may tend to nullify any relaxation at this time, the war agency said. Moreover, decrease in waste paper collections or paper production would adversely affect future programs, Government officials emphasized.

A net increase in third-quarter allocations for all paper users of 27,600 tons groundwood and book paper and approximately 29,000 tons of fine paper would make the relaxation possible, officials said.

Military cutbacks have increased the supply of some chemicals used in manufacturing wallpaper colors, industry members were told. However, chrome pigments are still in tight supply and will prevent early release of many desired colors, including yellow, orange and green. Organic pigments (Class B, C and D colors of lower grades) are in better supply and releases for civilian uses may be increased. However, permission to purchase the chemicals would merely constitute a "hunting license," a Government spokesman emphasized.

Ultramarine blue colors, hard and chrome black, lamp black and precipitated black may be obtained in certain industrial areas, although iron oxide yellows, ochres, siennas, white lead and zinc oxides continue tight, a WPB Chemicals Bureau spokesman said. Altogether, while availability of wallpaper raw stock may be expected to increase, so will the problems in connection with obtaining colors, he concluded.

Groundwood Makers Adopt New Standard

CHICAGO, July 5—The Groundwood Paper Manufacturers Association met last week and unanimously voted to adopt 1000 square inch 1000 sheets (25 x 40—1000) as the standard base for computing the weight of paper. The change from the present bases will become effective January 1, 1946. Details of the mechanics of changeover involving standard weights, OPA and WPB orders, trade customs , federal and industrial specifications and similar problems will be worked out in the interim.

Last year the Association had approved the change in principle and recommended to the American Paper and Pulp Association its adoption as an industry-wide policy. Now the groundwood paper industry is making the change, regardless of other branches of the industry, because its members feel that the change is logical and beneficial both to mills and customers; will inevitably eventually become the standard for the entire industry and can best be done now while inventories of paper in the hands of mills, distributors and users are at the all time low.

The new standard will replace five different standards now in use in the groundwood industry and in the paper industry generally for different products; 25 x 38—500 used generally for high grade printing paper; 24 x 36—500 used for other printing grades and converting grades; 24 x 36—480 used for hanging paper; 20 x 24—500 used for coating paper and 17 x 22—500 used for writing grades.

Canadian Pulp Allotments Up

WASHINGTON, D. C., July 5, 1945—Canadian pulpwood available to United States mills for importation during 1945 will total 1,800,000 cords, members of the Canadian Pulpwood Industry Advisory Committee were told at a recent meeting, the War Production Board reported today. This represents an increase of 550,000 cords over the base quota of 1,250,000 cords, all of which will go into pulp and paper products for military and essential civilian use, the war agency said. The total represents an increase over the 1944 allotment of Canadian wood of 295,000 cords, and when delivered will provide approximately 11 per cent of the entire United States pulpwood consumption.

Adherence to historical patterns in the shipment of this pulpwood from the wood-producing provinces of Canada to United States mills will be insisted upon by Canadian timber control authorities, WPB officials said. Thus, mills can import only from those areas in which they have normally and historically operated.

WPB said that the additional pulpwood will be generally distributed among those United States mills now owning wood already produced and ready for shipment from Canada. Fewer freight cars may be available for the movement of this wood during the remainder of 1945 than were available last year, but every effort will be made to get United-States-owned wood from Canadian forests, members were informed.

Individual mill shipments from Canada to the United States will be reviewed in the early fall, and the transportation situation then prevalent at each mill will determine its final share of supplemental pulpwood, WPB said.

First Swedish Pulp Arrives

The first shipment of wood pulp from Europe to arrive in the United States since the outbreak of the war in Europe, reached New York this week from Sweden. It amounted to 2,000 tons of rayon pulp.

From now on, Swedish interests here suggest, there should be a fairly constant arrival of pulp ships from Sweden and it is understood that the Swedish Cellulose Association, which comprises practically all the pulp producers of that country, expects to be able to send to the United States approximately 1 million tons of pulp in the next year. This is somewhat higher than the average annual export from Sweden to this country in prewar years. In 1939 Swedish pulp production approximated 3½ million tons, of which about 2½ million tons were exported.

According to information here, Swedish pulp mills have ample supplies of pulpwood cut and in their stockpiles. But because of a coal shortage, it appears that Swedish producers will exchange some of their present stockpile for British coal.

Foley Joins Rockwell-Barnes

CHICAGO, July 5—Rockwell-Barnes Company announces the addition of Frank J. Foley to its executive staff. Mr. Foley is widely known in the paper industry throughout the country and had been sales manager of Blandin Paper Company prior to joining Rockwell-Barnes. In his new position, Mr. Foley will be responsible for mill contacts and development work to improve quality and maintain grade standards of paper which the company converts.

Price & Pierce Ltd.

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(*Items marked with star are sold on West Coast only.)

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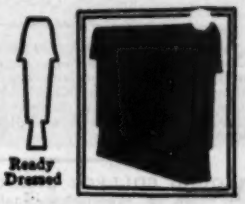

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"A company of substantial position in the industry wishes to know of several young men, chemists and chemical engineers, of high order of technical education and of some proved ability in research and development, who are interested in making professional careers for themselves limited only by their own abilities.

"Unexpired terms in the armed services are no deterent to a post-discharge arrangement.

Address Box 45-335 care Paper Trade Journal. JL-19

Wanted paper salesman to represent a paper converting mill in eastern Pennsylvania territory. We prefer one who has had some experience with the paper jobbing trade, and who resides in or about Philadelphia. In replying, please state qualifications. Address Box 45-345 care Paper Trade Journal. JL-5

SUPERINTENDENT for finishing department in large modern midwestern paper converting plant. Must be expert in laminating and coating of paper, plating, stack and friction calendering, and have a good chemistry background in paper and related materials. Knowledge of water-proofing of paper and application of lacquer and plastic coatings necessary. Address Box 45-210 care Paper Trade Journal. TF

WANTED—CHIEF CHEMIST for pulp and paper mill located on Pacific Coast. Apply in own handwriting giving references, experience and other pertinent information. Address Box 45-243 care Paper Trade Journal. TF

MACHINE TENDER for cylinder machine operations. Must be experienced at this particular kind of machine operations. Prefer high school graduate or equivalent. Address Box 45-293 care Paper Trade Journal. TF

WANTED—Paper Bag Machine Adjuster. High hourly rate, over time. Post war employment. State experience. Address Box 45-343 care Paper Trade Journal. J1-5

HELP WANTED for New England Book and Specialty Mill—Fourdrinier Machines:—6 Backtenders, 6 Thirdhands. Address Box 45-352 care Paper Trade Journal. J1-19

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SALESMAN for large folding carton and specialty manufacturer. Unusual opportunities. Give full qualifications, age and draft status. Replies held in strictest confidence. EMPIRE BOX CORPORATION, GARFIELD, N. J. A-2

WANTED—Machine Tender, Master Mechanic, Beater Engineer. Middle aged men preferred. Small .009 straw mill, slow running machines. Keuka Paper Corp., Pen Yann, N. Y. J-12

MACHINE ERECTOR & DEMONSTRATOR —preferably with experience in paper mill or paper converting machinery such as waxing, corrugating printing, roll winding, slitting, etc.; must have thorough all around machinist experience. Good post-war opportunity. State age, experience, salary expected. Address Box 45-375 care Paper Trade Journal. TF

WANTED—Technical Director for two-machine mill located in mid-west producing bleached paper specialties. Must understand bleaching, refining and handling of personnel. Give full information on education, previous experience and salary expected. Address Box 45-378 care Paper Trade Journal. J-5

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SUPERINTENDENT—20 years experience in paper bag conversion of grocery, sacks and aniline or oil ink specialty bags. Capable of handling all bag shop problems. Thorough experience in supervision of help, maintenance and repairing of machines. Address Box 45-355 care Paper Trade Journal. J1-5

YOUNG COLLEGE GRADUATE — Experienced in supervision, quality and technical control, also coatings, resins, plastics and board manufacturing—seeks opportunity in paper and allied fields. Address Box 45-381 care Paper Trade Journal. TF

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SALES AND SALES SERVICE—37. Dyes, wires, press rolls, starch, chemicals, etc., wanted by technical graduate, American. 15 years paper technologist. 6 years paper mill superintendent. Address Box 45-387 care Paper Trade Journal. J-12

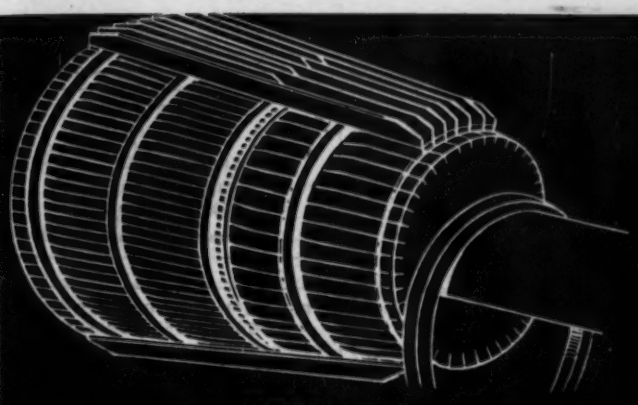


FIGURE 1.

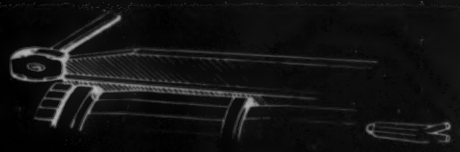


FIGURE 2.

FIGURE 3.

FIGURE 4.

FIGURE 5.

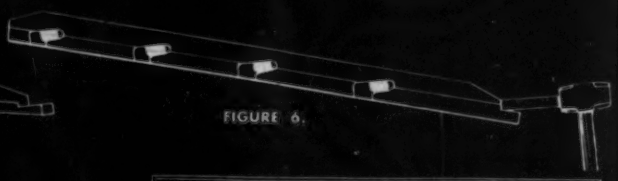


FIGURE 6.

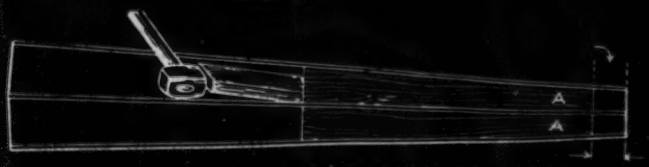
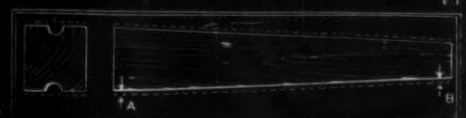


FIGURE 7.



How to Shape Woods

1. Remove equal amounts from both sides.
2. Keep sides parallel with original surfaces (A-B).
3. Remove a little and check fit. Do not attempt to complete the trim at one time for fear of making wood under size and worthless.

FIGURE 8.

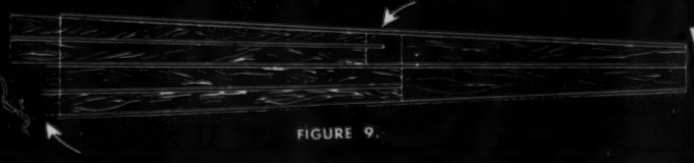


FIGURE 9.

How to Refill an X-66 Jordan Plug

1. Remove keeper ring from small end.
2. Use 10-lb. sledge, being careful not to hit plug. A special forked bar tool will protect plug and assist bar removal.
3. Remove all rust and scale from slots. Clean to base metal, but do not enlarge slots.
4. Coat slots and bars with thin film of 10-W oil to prevent further rust and make driving easier.
5. Use 2-lb. hammer and wooden or brass block to seat bars solid against plug.
6. Hold brass or hardwood block against bar and drive with 2-lb. hammer toward large end of plug until bar is flush with keeper ring seat.
7. Position all long bars first and shrink on keeper ring. Then fit woods "A" by hand—1" short of final position on Nos. 3, 5, 6, and 7 jordan plugs; 2" short on Nos. 1, 2, 2-A, and 4 jordan plugs. Then drive woods snugly up to keeper ring—not too tight—using 2-lb. hammer.
8. Position short bars, following procedures similar to Steps 5 and 6.
9. Fit woods by hand 1" or 2" short of position as in Step 7. Drive woods snugly home. Saw off excess.

IMPORTANT — Allow refilled plug to soak at least 8 hours before placing in operation.

★ ★ ★

These illustrated instructions for refilling X-66 Jordan Plugs were prepared for the convenience of our customers. Incidentally, the superiorities and advantages of X-66 construction can be observed in the sketches:—the deep slots with full-length metal bar support; the heavy and strong bands; the beads on the bars and corresponding grooves in the woods, preventing any possibility of the woods rising; uniform width of the bars, which means that they retain the same working surface as they wear down.

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1—120" Hamblet single cutter and layboy, in good condition, with overlapping device for layboy. Layboy holds four piles.

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34" Inman Slitter.
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1—60 H.P. Fairbanks Morse Diesel Engine, connected to a 40 KVA Generator.

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Bigelow 3-3720 J-5

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1—7-Roll 49" wide Holyoke Super Calender Stack, complete with 50 H.P. G. E. a.c. 3 phase 60 cycle, 220 volt motor equipment. Machine in perfect condition.
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1—Noble & Wood Pony Jordan. Good condition.
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1—New pair cast steel double suspension spring type beater bearings for 8" diameter journal—Noble & Wood beater roll. Never used
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3—200 KVA —33000-2300/4000 volts transformers
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Mills: Walloomsac, New York
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WANTED

4 to 6 cylinder machine with trim from 60" to 86".

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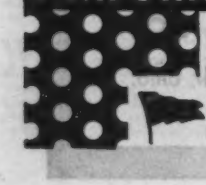

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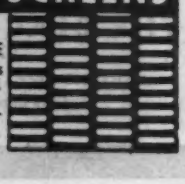

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1—Miami #1, anti-friction, motor drive, 3/16" single filling.
1—Miami #1, plain bearing, motor drive, slotted for 1/2" solid bar or 3/16" duplex.
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1—25 x 138" Millspaugh suction couch.

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1—24 x 136" Downingtown Extractor roll.

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1—22" x 132" rubber covered press roll.
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1—68" Kidder spot sheeter.
1—60" Moore & White sheeter.

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2—Midwest High Speed Iron Tub Beaters, rolls 61 x 60.

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1—#2 Lannoye Pulper.

JORDANS

2—Black-Clawson #2 Jordans.
1—Noble & Wood Monarch Jordan.
1—Noble & Wood Mammoth Jr. Jordan.

PASTER

1—114" Silicate Paster.

VATS

4—pair Downingtown Iron Vat Ends for 36" Molds.

CENTRIFUGAL PUMP

1—Allis Chalmers closed impeller, 1000 GPM, 150' Head.
1—Turbine driven centrifugal pump, Murray turbine, Frederick 8" DSV pump 2500 GPM, 95' head.

WINDER

1—4-drum Moore & White winder, 116" wide. Handle 60" diameter rolls.
1—104" Model 18 Cameron.

DRYERS

40 dryers 48 x 46.
19 dryers 36 x 95.
10 dryers 48 x 96.
17 dryers 48 x 160.
30 dryers 42 x 74.

TABLE ROLLS

30 table rolls 4 x 145.
28 table rolls 4 x 122.
200 table rolls various sizes.

VACUUM PUMPS

2—#4 Nash all bronze.
1—#3 Nash all bronze.
1—#6 Nash cast iron.
1—#4 Nash cast iron.

One fourdrinier machine, wire 110" x 60'. Suction couch 22". Two main presses, 29 dryers 48 x 109", one calender stack.

One fourdrinier machine, wire 91" x 64'-11"; with spiral bevel gear drives. Table rolls mounted on top of rail. 22" suction couch. First press Beloit suction, rubber covered; second press conventional, reversed. One smooth press; 26 dryers 48 x 88"; one 9-roll calender; one two-spool reel; one two-drum winder.

One good pulp drying machine 144" wide, extra heavy, complete.

Three Beloit Aldrich type shakes.

SHARTLE BROTHERS MACHINE CO.

Middletown, Ohio. J-12

FOR SALE

BEATERS
2—2000 lb. Holyoke Iron Tub Beaters.
1—1000 lb. Dayton Beater.
2—400 lb. Gavit—iron tub beaters.

BLOWER
1—30" Buffalo.
Various other sizes.

CALENDER STACKS
1—11-Roll 92" Face Calender Stack—complete with Drive.
1—36" 7-roll—Holyoke Machine.
1—77" 2-roll—Moore & White.
1—84" 5-roll—Black-Clawson.

CENTRAP
1—Shartle Brothers Centrap.

CYLINDER MOULDS
1—48" Diameter x 96" Face.
8—30" diameter x 72" face.
3—30" diameter x 74" face.

DRIVES
1—D. O. James 75 H.P. Speed Reducer with couplings and motor base. Ratio 2.16 to 1. 900 RPM to 418 RPM.
1—Pulmax Drive.

DRYERS
1—48" diameter x 94" face.
24—36" diameter x 82" face.
1—24" diameter x 84" face. (Baby).
1—16" diameter x 84" face. (Baby).
1—36" diameter x 116" face.
2—28" diameter x 68" face.

EMBOSSER
1—28" two roll Embossing Calender.

ERKENSATORS
3—I. W. E. Erkensators—bronze construction—complete with motors, starters and distributing box.

FLAT SCREENS
2—8 plate Flat Screens.
1—18 plate Flat Screen, with scraper.
1—12 plate Flat Screen.
2—12 plate Packer Type Pulp Screens with steel vats

JORDANS
1—Pony Horne Jordan. Spare New Fillings.
1—Black-Clawson Jordan (belt driven).
1—#9 Emerson Jordan—for direct connection of a motor — requires use of 400 H.P. motor.
1—Smith & Winchester.

PULP EQUIPMENT
1—84" Carthage Chipper—complete and in excellent condition.
1—32" three pocket Glens Falls Grinder (for 27" wood).
3—Rotary incinerators—9' diameter x 20' long.
4—27" four pocket Sandy Hill grinders (for 24" wood—including 1000 H.P. motor for each, starting equipment, etc.).

PULPERS
1—#2 Lannoye Pulper.
1—Jones Pulper — direct connected to 60 H.P. motor—3 phase, 60 cycle, 440 volts —forward and reverse starting.

PUMPS
1—Buffalo Pump—5500 g. p. m., direct connected to 100 H.P. Motor (50' head).
1—Shartle Brothers duplex 10 x 20 stock pump.
1—Moore & White triplex 10 x 12 stock pump.
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.

REELS
1—2 Bowl Reel — 112" face — bowls 20" diameter.
1—2 Bowl Reel—63" face.
1—2 Bowl Reel—110" face.

REFINERS
2—#1 Claflin Refiners.

ROLLS
500—Brass tube—steel tube—rubber covered iron rolls—various sizes.

RUBBER COUCH ROLL
1—72⅛" Face x 9" diameter (soft rubber).

SAVEALLS
1—Shartle Bros. decker 36" diameter x 60" face, including couch roll.
1—Saveall 36" x 136" cylinder mold, antifriction bearing equipped, including couch roll.

SHREDDERS
1—#25 CRSE Mitts & Merrill Hog.
1—Gilman Shredder—used one year.

SHEETERS
1—110" Horne single knife rotary sheet cutter
1—48" Langston heavy duty chopper (this is a combination machine, combining a slitter, scorer, sheeter and chopper.)

SIZING MACHINE
1—36" Waldron sizing machine.

SLITTERS
1—114" Two drum Langston Slitter & Winder
1—110" Beloit slitter (slitter attachment only)
1—114" Two drum Kidder slitter and winder
1—36" Koegel slitter and winder.

SUCTION BOXES
1—Nash 100" face Suction Box.
3—Brass Suction Boxes—90" drilled face.
2—Brass Suction Boxes—77½" drilled face

SUCTION COUCH ROLL
1—Sandusky Suction Couch Roll — 18" diameter x 130" face — Complete with Sturtevant Vacuum Pump and drive mechanism.

SUCTION PRESS ROLL
1—Sandusky suction press roll, 14⅛" diameter x 68" drilled face.

WINDERS
2—65" Cameron Tensions for Winders.

J. J. ROSS CO., 250 Frelinghuysen Avenue, Newark 5, New Jersey
TEL. BIGELOW 3-3720 J-5

We are always in the market to purchase your surplus or idle machinery. What have you to offer?

THE FOLLOWING MATERIAL NOW SETTING UP IN MILL

CALENDERS 124" nine roll, box frame, Lobdell. Bottom roll 24" dia. two 16" dia. int. 11½-12" dia. Warren doctors. Beloit hypoid drive, new 1936.

104" ten roll, box frame, Farrel. Bottom roll 20" dia. one 10"; seven 10" and top 14". Warren doctors. Beloit hypoid drive, put in 1936.

104" eleven roll, box frame, Pusey & Jones, Bottom roll 18" dia. int. and top 9½-10" dia. Four rolls bored for steam. Warren doctors. Mortise gear drive.

REELS: Two—104", also one 115". Pusey & Jones offset with removable drums about 18" dia. slip belt disc for each drum. Drums about 33" on centers.

SLITTERS & WINDERS: Two 104" Warren two drum with low type slitter, 1 R.H. and 1 L.H.

SCREENS: Two 8 plate open side Packer with 12 x 43 screen plates.

PUMPS:
2—18 x 12 Goulds triplex stuff.
1—10 x 20 Shartle triplex stuff.
1—12 x 20 Shartle triplex stuff.
1—12 x 16 Shartle triplex stuff.
1—7 x 16 Shartle duplex stuff.

PUMPS:
1—Warren water pump, type 12 DL24, capacity 4800 GPM 80 ft. head, 690 RPM, new 1940.
1—Frederick 5" cent. stock, type TS, 50 ft. head, capacity 600 gallons, 1165 RPM.
1—Midwest Eng. Co. 6" suction and 6" discharge, new.

BEATERS: 2—Horne patent iron tub.
1—Holyoke broke.

SHAFTS & CORES: 11—72 x 6½ cutter shafts and 28 143 x 2¾-3½ O.D. coreshaft, also 11—151 x 2¾-3½ O.D. core shaft.

HOISTS: Four 5 ton Ingersoll Rand Air Hoists with trolley and I beams new 1927.

STITCHER: 1—Bliss Box Assembling Machine Model H.

PACKAGE: 1—Better Packages Inc. counterboy turntable table with compressor and motor with sealing tape holder.

TARGET MACHINE: 1—Broke target machine, tank about 8 ft. dia. x 18 ft., capacity two tons, ten years old, with two stage 6" Warren pump, type 250 D19, 100 HP, 200 ft. head, 1170 RPM.

FRANK H. DAVIS COMPANY, 175 Richdale Ave., Cambridge 40, Mass. J-19

FOR SALE | FOR SALE | FOR SALE

FOR SALE

by JACK ROSS PAPER MACHINERY CO.

17 Porter Avenue, Newark 8, N. J., Waverly 3-5675

1—Improved Paper Machinery Company 3 roll Hydraulic Wet Machine. Cylinder Mold 36" diameter 84" face. Complete with enclosed drive. Prints and photos on request. Used 1 year.
2—Pusey & Jones Horizontal Digesters. Welded equipment with Logan Circulators. 24' high and 7' diameter. 125# working pressure. Prints on request.
1—Guyton-Cumfer Saturator. Tank 50" wide. 5 gates complete. Prints on request.
1—Moore & White Flat Screen. 16 plates 12" x 24" .015 cut.
1—Moore & White Flat Screen. 20 plates 12" x 24" .015 cut.
1—Packer Flat Screen. 10 plates 12" x 42" .015 cut.
1—2" to 6" Oster Pipe Threading Machine. Direct connected to motor 440-3-60.
2—#3 Vertical Reeves Drives totally enclosed—ball bearing equipped. Ratio 5:1. Used year and a half.
4—Driers—112" face x 48" diameter complete with 2 deck frames, gears, etc.
1—A. D. Wood Saveall—cylinder—60" face by 48" diameter—ball bearing equipped—rebuilt—specifications on request.
1—No. 1 Voith Pulper—capacity 20 tons per day—requires 20 h.p.
1—42" Liner and combining machine. Fourteen 6" diameter steam heated rolls and one drier 24" diameter.
3—Improved Paper Machy. Corp. #2 Knotters Bronze fitted. Good condition. Prints on request.
2—14" x 20" Connersville Vacuum Pumps. These pumps are fully rebuilt.
3—12" x 18" Connersville Vacuum Pumps. These pumps are fully rebuilt.
1—Downingtown 2500 lb. Iron Tub Cyclone Beater. Beater rolls 60" face, 72" diameter. This beater is in excellent condition, having been in operation less than 2 years. Prints on request.
2—Holyoke Platers—2 roll, 36" face x 18" diameter—complete with drive.
1—Nichols-Herreshoff Lime Kiln—vertical 65 tons capacity. Prints on request.
1—72" two drum Pusey & Jones Slitter & Winder will rewind 40" diam. rolls.
1—100" two drum Warren Slitter & Winder.
1—100" Two Bowl Reel—Bowls 20" diam.
1—E. D. Jones Standard Jordan with fast coupling and extended base for direct connection to motor.
1—Farrel Roll Grinder will take rolls 28" diam. 18' long. Motor equipped. 2—10 h.p. Motors. 1—15 h.p. Motor—Excellent condition. Photos on request.
1—Williams #30 type G. A. Bark Hog with 125 h.p. Synchronous motor. Ball bearing equipped and new spare parts—used one year.
1—Sumner Disc Barker—72" diam. disc. Anti-friction bearings. Direct connected 30 h.p. motor. Used 5 months.
1—140" two drum Warren Slitter & Winder.
40 Driers—96" face x 28" diameter complete with 2 deck frames, gears and bearings.
1—Sturtevant Bale Pulper with conveyor complete with 150 h.p. motor and starter.
8—10" x 20" Shartle Brothers Triplex Stock Pumps.
1—12" x 20" Shartle Brothers Triplex Stock Pumps.
1—8" x 18" Shartle Brothers Triplex Stock Pumps.
1—8" x 10" Worthington Triplex Stock Pumps.
3—12" x 12" Goulds Triplex Stock Pumps.
1—72" Seybold Automatic Knife with motor. (Like new.)
All above pumps in excellent condition.
2—1000 lb. Horne Iron Tub Beaters.
1—1200 lb. Holyoke Wood Tub Beater.
1—100" Proctor & Schwartz festoon drier—complete.
1—Trimbey Pulp Screen perforations. 090—30 tons capacity.
18 Driers—36" diameter—82" face—2 deck frames, gears and bearings.
6 Driers—36" diameter—82" face.
4 Sets of Press Rolls 15" diameter—87" face.
1 Set of Size Press Rolls—84" face—16" diameter.
1—750 lb. Downingtown Iron Tub Beater. Beater roll 36" face, 52" diameter. Iron Midfeather. Iron hood. Excellent condition. Used three years.
1—30 h.p. Allis Chalmers Motor. 600 RPM 2300 Volts. 3 phase. 60 cycle.
1—40 h.p. Fairbanks Morse Motor. 3600 RPM. 3 phase. 60 cycle.

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From single items to complete plants.

Write, telephone or wire whatever you have for sale.

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FRICTION CLUTCHES

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APPLETON WOOLEN MILLS
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NOW'S THE TIME FOR *Your* BIG "MOP-UP"!

RE-SOLICITATION is the keynote for a victorious "mop up" in the Mighty 7th War Loan. Bond rallies plus continuous competition between departments help to keep Bond subscriptions on a quota-topping climb. Strategic poster displays . . . showings of "Mr. & Mrs. America," the Treasury film . . . distribution of the War Finance Booklet, "How To Get There," and the handy Bond-holding envelopes play an important part. But, above all else, arrange to have every employee asked *once more*—and personally urged *once more*—to meet his personal quota in the Mighty 7th!

The Payroll Savings Plan is the mainstay of every War Loan—meeting your plant quota is vital to the success of the 7th! Remember we have to make two drives in 1945 do the work of three last year. Put on an intensive "mop up" final to help mop up the Japs, cut the tentacles of inflation—and lay the foundation of security.

The Treasury Department acknowledges with appreciation the publication of this message by

PAPER TRADE JOURNAL

THE MIGHTY 7th WAR LOAN

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PAPER CONVERTING MACHINES
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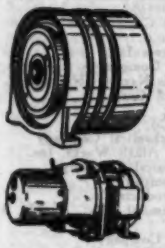
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Valley Iron Works
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Moore & White Co
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Shartle Brothers Machine Co.

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The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Shartle Brothers
United States Rubber Co.
Westinghouse Electric Corporation

DRIERS
Black-Clawson Company
Murray Mfg. Co., D. J.
J. J. Ross Company
Ross, J. O. Engineering Corp.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

DRIVES
Allis-Chalmers Mfg. Co.
Appleton Machine Co.
Bird Machine Co.
Black-Clawson Company
Davis, Frank H., Co.
De Laval Steam Turbine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
General Electric Company
Horton Manufacturing Co.
Rodney Hunt Machine Co.
Montague Machine Co.
Moore & White Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
T. B. Wood's Sons Co.
Valley Iron Works Co.
Westinghouse Electric Corporation

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Fibre Making Processes, Inc.
E. D. Jones & Son Co.
Moore & White Co.
Noble & Wood Machine Co.
Norwood Engrg. Co.
D. J. Murray Mfg. Co.

DYESTUFFS
Calco Chemical Co.
Ciba Company
E. I. du Pont de Nemours & Co.
Geigy Co., The
General Dyestuff Corp.
National Aniline Division, Allied Chemical & Dye Corp.
Paper Makers Chemical Department, Hercules Powder Co.
C. K. Williams & Co.
Witco Chemical Co

EQUIPMENT INSTALLATION
Merritt-Chapman & Scott Corp.

EVAPORATORS
Black-Clawson Company
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Traylor Engineering & Mfg. Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

FEEDERS
Builders-Providence, Inc.
Merrick Scale Mfg. Co.
Leeds & Northrup
Traylor Engineering Co.
Wallace & Tiernan

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Bloomfield Woolen Co.
Bulkley, Dunton Pulp Co. Inc.
Draper Bros. Corp.
Fitchburg Duck Mills
Huyck & Son, F. C.
Lockport Felt Co.
Mt. Vernon-Woodbury Mills, Inc.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Woodward, Baldwin & Co.

FELT GUIDES
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FILLERS
American Colloid Co.
Amer. Cyanamid & Chem. Corp.
American Resinous Chemicals Corp.
International Pulp Co.
W. H. Loomis Talc Corp.
Union Talc Co.
Vanderbilt Co., R. T.
Witco Chemical Co.

FILTERS
Moore & White Co.
J. O. Ross Engrg. Corp.
Worthington Pump & Mchy. Corp.
Witco Chemical Co.

FLOORING, GRATING & TREADS
Hendrick Mfg. Co.
Norton Co.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
United States Rubber Co.

FORMING MACHINES
Downingtown Mfg. Co.
Noble & Wood Machine Co.
Oliver United Filters
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

WHERE TO BUY

GEARS
Black-Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

GRINDERS
Covel-Hanchett Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Simonds Worden White Co.
United States Rubber Co.

HEATING, VENTILATING AND AIR CONDITIONING
The Appleton Machine Co.
Armstrong Machine Works
Fibre Making Processes, Inc.
E. D. Jones & Sons Co.
General Electric Co.
Grinnell Company
Leeds & Northrup
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Rose Engineering Corp., J. O.
Shartle Brothers Machine Co.
Valley Iron Works Co.
Worthington Pump & Mchy Corp.

HOISTS
Appleton Machine Co.
Dilts Machine Works
Rodney Hunt Machine Co.
Ingersoll-Rand Co.
E. D. Jones & Sons Co.

HOSE (Air, Water, Suction, etc.)
The Cincinnati Rubber Mfg. Co.
The Manhattan Rubber Manufacturing Division of Raybestos-Manhattan Inc.
United States Rubber Co.

INSTRUMENTS, TESTING AND MEASURING
W. H. & L. D. Betz
M. P. Bowsher
The Bristol Company
Builders-Providence, Inc.
The Foxboro Company
General Electric
W. & L. E. Gurley
Leeds & Northrup Company
National Technical Laboratories
R. F. Perkins & Son
Taber Instrument Corp.
Taylor Instrument Cos.
Wallace & Tiernan Co., Inc.

JORDAN FILLINGS
Appleton Machine Co.
Behr Brothers Mfg. Co.
E. D. Jones & Sons Co.
Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black-Clawson Company
Dilts Machine Works, Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
Simonds Worden White Co.
Valley Iron Works Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
W. H. & L. D. Betz
Dilts Machine Works
E. D. Jones & Sons Co.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Taber Instrument Co.
Taylor Instrument Companies
Valley Iron Works Co.

LAY BOYS
Hamblet Machine Co.
Moore & White Co.
Shartle Brothers

LUBRICANTS
Gulf Oil Corporation
Gulf Refining Co.
Sinclair Refining Co.
Socony-Vacuum Oil Co., Inc.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

LUBRICATORS
Hills-McCanna Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Montague Machine Co.
Lobdell Car Wheel Co.
Walker-Goulard-Plehn Co.

MIXERS
Youngstown Welding & Engrg. Co.

MOISTENING EQUIPMENT
The Spray Engineering Co.

MOTORS AND GENERATORS
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Co.
Ingersoll-Rand Co.
Reliance Electric & Engrg. Co.
Westinghouse Electric Corporation

PACKING BOXES
Johnson Corporation
Shartle Brothers Machine Co.

PACKING
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.

PAPER MACHINES
Black-Clawson Company
Downingtown Mfg. Co.
Thomas W. Hall Co.
Moore & White Co.
Pusey & Jones
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester

PAPER MACHINE SLICES
Black-Clawson Company
E. D. Jones & Sons Co.
Montague Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPERMILL BUILDERS
Merritt Chapman & Scott Corp.

PAPER TUBE MACHINERY
Dietz Machine Works
Thomas W. Hall Co.
Hudson Sharp Machine Company
Langston Co., Samuel M.

PASTING MACHINES
Black-Clawson Company
Davis, Frank H., Co.
Murray, D. J., Mfg. Co.
Moore & White Co.
Pendevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John

PERFORATED METAL
Allis-Chalmers Mfg. Co.
Harrington & King Perforating Co.
Hendrick Mfg. Co.

PIPE
Black-Clawson Company
Crane Company
Grinnell Company
Shartle Brothers Machine Co.
Taylor Forge & Pipe Works
Walworth Company
Youngstown Welding & Engrg. Co.

PLATERS
Perkins & Son, Inc., R. F.

PLATES
Black-Clawson Company
Hendrick Mfg. Co.
O. Ross Engrg. Corp.
Shartle Brothers Machine Co.
Timken Roller Bearing Co.

PLUGS
Black-Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

PRESSES
Black-Clawson Company
Farrel-Birmingham Co.
Dietz Machine Wks.
Thomas W. Hall Co.
Hudson-Sharp Machine Co.
Paper Converting Machine Co., Inc.
Pendevin Machine Co.
Rotogravure Engineering Co.
Shartle Brothers
Valley Iron Works Co.
Waldron Corp., John
Weber, Herner C.

PUG MILLS
Traylor Engineering & Mfg. Co.

PULPS
Andersen Co., J.
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Elof Hansson, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.

PUMPS
Allis-Chalmers Mfg. Co.
Black-Clawson Company
Dorr Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Hills-McCanna Co.
Ingersoll-Rand Co.
Johnson Corp.
Moore & White Co.
Nash Engineering Co.
Noble & Wood Machine Co.
Paper Converting Mch. Co.
Quimby Pump Co. Div. of H. K. Porter Company, Inc.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Company
Worthington Pump & Machinery Corp.

RECOVERY SYSTEMS
Bulkley, Dunton Pulp Co., Inc.
Rodney Hunt Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones
Rose Engineering Corp. J. O.
Valley Iron Works Co.

RECTANGULAR BINS
Traylor Engineering & Mfg. Co.

REELS
Black-Clawson Company
Downingtown Mfg. Co.
De Laval Steam Turbine Co.
Hudson Sharp Machine Company
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Rodney Hunt Machine Co.
Rotogravure Engrg. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.

REFINERS
Appleton Machine Co.
Behr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
The Hermann Manufacturing Co.
E. D. Jones & Sons Co.
Murray, D. J. Mfg. Co.
Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout, Waldron & Co.
Sutherland Rafiner Corp.
Valley Iron Works

REGULATORS
Allis-Chalmers Mfg. Co.
Armstrong Machine Works
Bird Machine Company
The Bristol Company
The Brown Instrument Co.
The Foxboro Company
Jones, E. D., & Sons Co.
General Electric Co.
Johnson Corp.
Leeds & Northrup Company
National Technical Laboratories
Noble & Wood Machine Co.
Shartle Brothers
Taylor Instrument Companies
Wallace & Tiernan
Westinghouse Electric Corporation

RESINS
American Cyanamid & Chemical Corp.
American Resinous Chemicals Corp.
The Resinous Products & Chemical Co.

ROLLS
Appleton Machine Co.
Black-Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Improved Paper Machy. Corp.
Lobdell Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Montague Machine Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
Perkins, R. F., & Sons Co.
Pusey & Jones Corp.
Rochlin Engraving Co.
J. J. Ross Company
Rodney Hunt Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Shenango-Penn Mold Co.
Sinclair Co.
Smith & Winchester Mfg. Co.
Stearns Magnetic Mfg. Co.
United States Rubber Co.
Valley Iron Works Co.
Waldron Corp., John

ROLL COVERS
The Cincinnati Rubber Mfg. Co.
Youngstown Welding & Engrg. Co.

ROLL STANDS
Cameron Machine Co.
Johnstone Eng. & Machine Co.
The Kohler System Company
Moore & White Co.
Pendevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.

ROTARY KILNS
Traylor Engineering & Mfg. Co.

SATURATING MACHINES
Black-Clawson Company
Moore & White Co.
Noble & Wood Machine Co.
Pendevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman C.

SCALES
Builders-Providence, Inc.
Merrick Scale Mfg. Co.

SCREEN PLATES
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Union Machine Co.
Union Screen Plate Co.

SCREENS
Allis-Chalmers Mfg. Co.
Appleton Wire Works
Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Harrington & King Perforating Co.
Hendrick Manufacturing Co
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Traylor Engineering & Mfg. Co.
Valley Iron Works Co.

SCRUBBERS
Traylor Engineering & Mfg. Co.

SHEET MACHINES
Thomas W. Hall Co.
The Hermann Manufacturing Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
Valley Iron Works Co.

SHOWER PIPES
Bird Machine Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
Improved Paper Machy. Corp.
Moore & White Co.
Shartle Bros. Mach. Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.

SIZING
American Cyanamid & Chemical Co
American Resinous Chemicals Corp.
Black-Clawson Company
The Dow Chemical Co.
du Pont, E. I., de Nemours & Co.
National Oil Products Co
Paper Makers Chemical Department, Hercules Powder Co.
Pioneer Salt Company
Socony-Vacuum Co.
Philadelphia Quartz Co.

SLITTERS
Black-Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson Sharp Machine Company
Johnstone Eng. & Machine Co.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Pendevin Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Simonds Worden White Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SPRAY NOZZLES
The Spray Engineering Co.

STAINLESS STEEL
Allegheny Ludlum Steel Co.
Eastern Stainless Steel Corp.
Industrial Steels, Inc.

STARCH
American Cyanamid & Chemical Corp
Clinton Co.
National Starch Products, Inc.
Stein, Hall & Co., Inc.

WHERE TO BUY

STEAM SPECIALTIES
Johnson Corp.
Shartle Bros. Mch. Co.
Stickle Steam Specialties Co.

STRAPPING & STRAPPING MACHINES
The Stanley Works

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOXES
Black-Clawson Company
A. E. Broughton & Co.
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Westinghouse Electric Corp.

SULPHUR
American Cyanamid & Chemical Corp.
Stauffer Chemical Company
Texas Gulf Sulphur Co.
Witco Chemical Company

SULPHUR BURNERS
Valley Iron Works Co.

TALC
American Cyanamid & Chemical Corp.
W. H. Loomis Talc Corp.
International Talc Company

TANKS
Frederick Mfg. Co.
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
The Noble & Wood Machine Co.
H. K. Porter Company Inc.
Rodney Hunt
J. O. Ross Engrg. Corp.
Shartle Brothers Machine Co.

Traylor Engineering & Mfg. Co.
United States Rubber Co.
Waldron Corp., John
Youngstown Welding & Engrg. Co.

THICKENERS, DECKERS & SAVEALLS
Bird Machine Company
Bulkley, Dunton Pulp Co. Inc.
Carthage Machine Co.
Dilts Machine Works
Dorr Co.
Downingtown Mfg. Co.
Montague Machine Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TITANIUM
E. I. Du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.
Witco Chemical Company

TOOLS
Acme Steel Company
Ingersoll-Rand Co.
The Stanley Works
Walworth Company

TRUCKS
Elwell Parker Electric Co.
Wright-Hibbard Ind. Elec. Truck Co.

TRAPS
Armstrong Machine Works
Crane Co.
Grinnel Company
Johnson Corporation
Shartle Bros. Mch. Co.

TUBS
Rodney Hunt Machine Co.
Noble & Wood Machine Co.
Shartle Brothers
Valley Iron Works Co.

TURBINES
Allis-Chalmers Mfg. Co.
De Laval Steam Turbine Co.
General Electric Company
Hunt, Rodney, Mach. Co.
Westinghouse Electric Corp.
Worthington Pump & Machinery Corp.

USED EQUIPMENT
Frank H. Davis Company
Gibbs-Brower Co.
Thomas W. Hall Co.
Noble & Wood Machine Co.
Rotogravure Engrg. Co.
J. J. Ross Company
Shartle Brothers Machine Co.

VALVES
The Bristol Company
Crane Company
Dilts Machine Works
Fibre Making Processes, Inc.
The Foxboro Company
Hills-McCanna Co.
E. D. Jones & Sons Co.
Kennedy Valve Mfg. Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
Noble & Wood Machine Co.
The Permutit Company
William Powell Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Taylor Instrument Companies
Valley Iron Works Co.
Walworth Company

VATS & VAT PARTS
Union Machine Co.
Union Screen Plate Co.

WASHERS
Bird Machine Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Rodney Hunt Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

WATER CONDITIONING
The Permutit Company

WAXING MACHINERY
Black-Clawson Co.
Potdevin Machine Co.
Rotogravure Engrg. Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WELDING EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Company
Walworth Company
Westinghouse Electric Corp.

WET MACHINES
Black-Clawson Co.
Carthage Machine Co.
Downingtown Mfg. Co.
Moore & White Co.
Montague Machine Co.
Noble & Wood Machine Co.
Pusey & Jones Corp.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WINDERS AND REWINDERS
Black-Clawson Company
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Thomas W. Hall Co.
Hudson-Sharp Mach. Co.
Langston Co., Samuel M.
Johnstone Eng. & Machine Co.
The Kohler System Company
Montague Machine Co.
Moore & White Co.
Paper Converting Mch. Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rotogravure Engrg. Co.
J. J. Ross Company
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Waldron Corp., John

WIRES
Appleton Wire Works
Black-Clawson Company
Bulkley, Dunton Pulp Co. Inc.
Cheney Bigelow Wire Works
Hayden Wire Works
International Wire Works
Lindsay Wire Weaving Co.
Shartle Brothers Machine Co.

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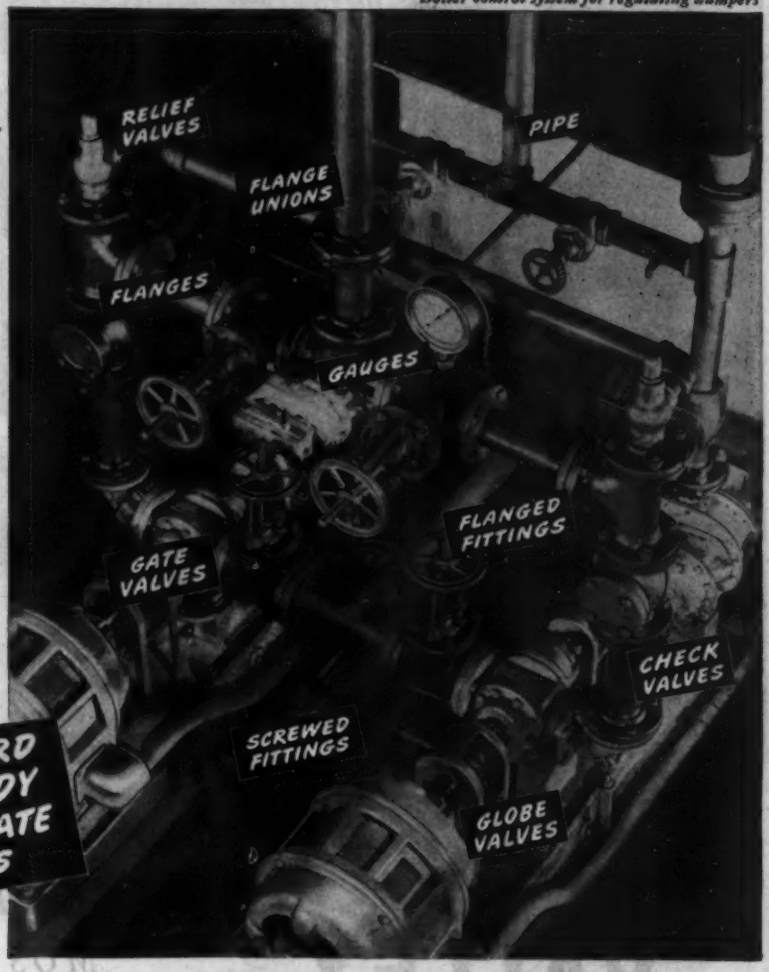
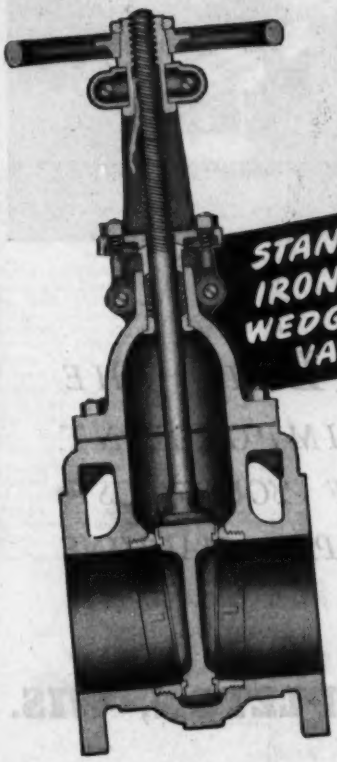
DEPEND ON CRANE . . . WHEN IT'S PIPING EQUIPMENT YOU NEED

ONE SOURCE OF SUPPLY • ONE RESPONSIBILITY FOR ALL PARTS • ONE STANDARD OF QUALITY

To keep piping at its best, to simplify and speed up deferred replacements—call on the Crane line. You choose from the world's greatest selection of piping materials—in brass, iron and steel. One source—your Crane Branch or Wholesaler—supplies on one order all your requirements. Every part is uniform in quality, backed by a single responsibility. Your whole task from ordering of parts to installing them is simplified—and at the same time you are benefiting by Crane Co.'s 90-year leadership in the field of piping materials. Below is an example of Crane complete lines—in Standard Iron Body Wedge Gate Valves.

Boiler control system for regulating dampers





SERVICE RECOMMENDATIONS: **Crane Standard Iron Body Wedge Gate Valves with Brass trim are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S.&Y. and Non-rising Stem patterns.**

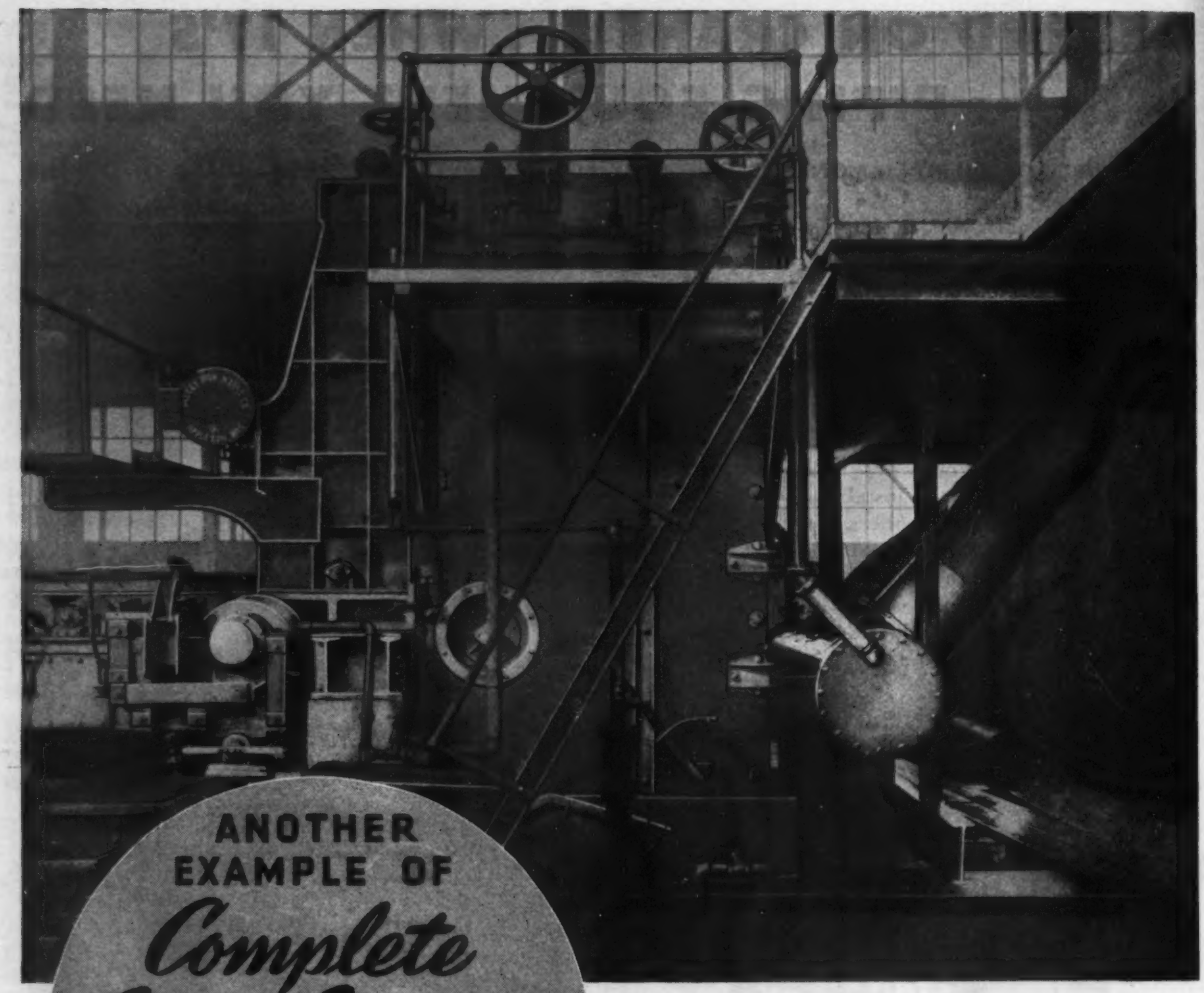
Working Pressures

Size of Valve	Screwed or flanged end valves		Hub end valves
	Saturated Steam	Cold water, oil or gas, non-shock	Cold water or gas, non-shock
2 to 12 in.	125 pounds	200 pounds	200 pounds
14 & 16 in.	125 pounds	150 pounds	150 pounds
18 to 24 in.	*	150 pounds	150 pounds

*For steam lines larger than 16-in., Crane 150-pound Cast Steel Gate Valves are recommended. (For sizes under 2 in., use Crane Clamp Gate Valves.)

CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. • *Branches and Wholesalers Serving All Industrial Areas*

CRANE VALVES · FITTINGS · PIPE
PLUMBING · HEATING · PUMPS



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